

FIG. 1A

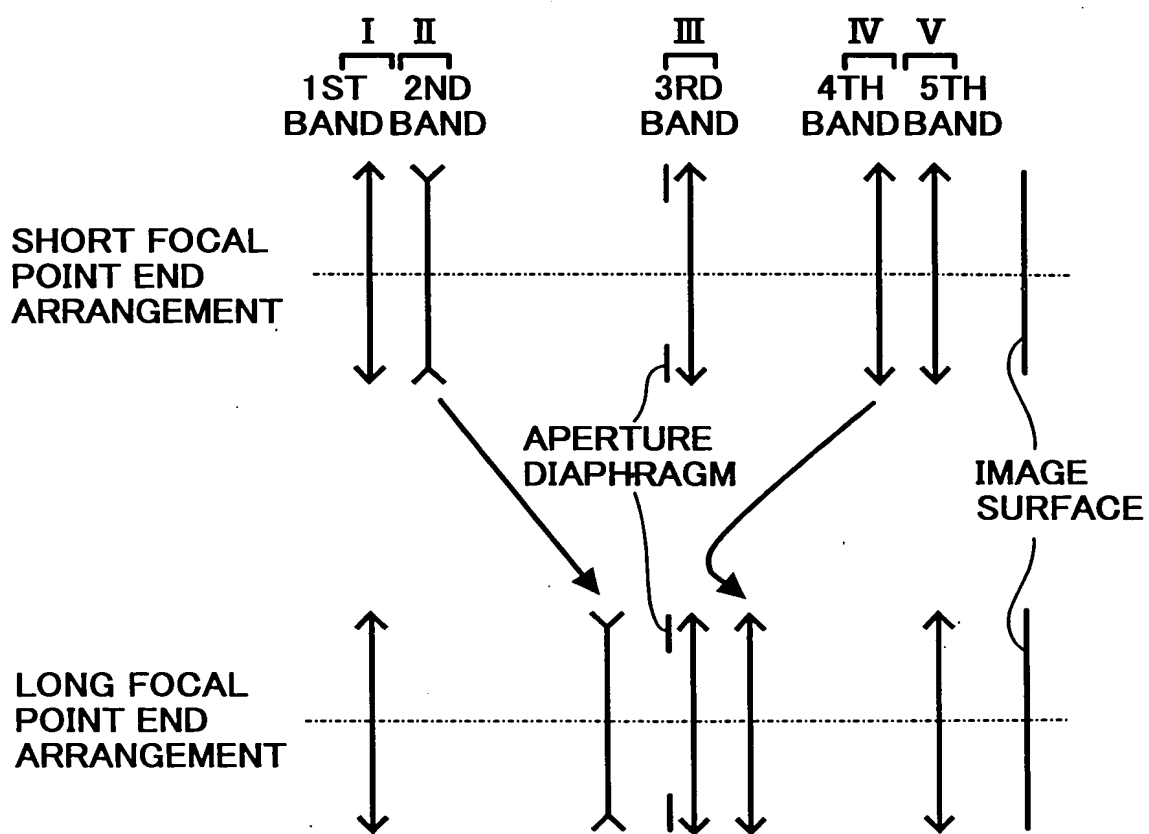


FIG. 1B

FIG. 1B

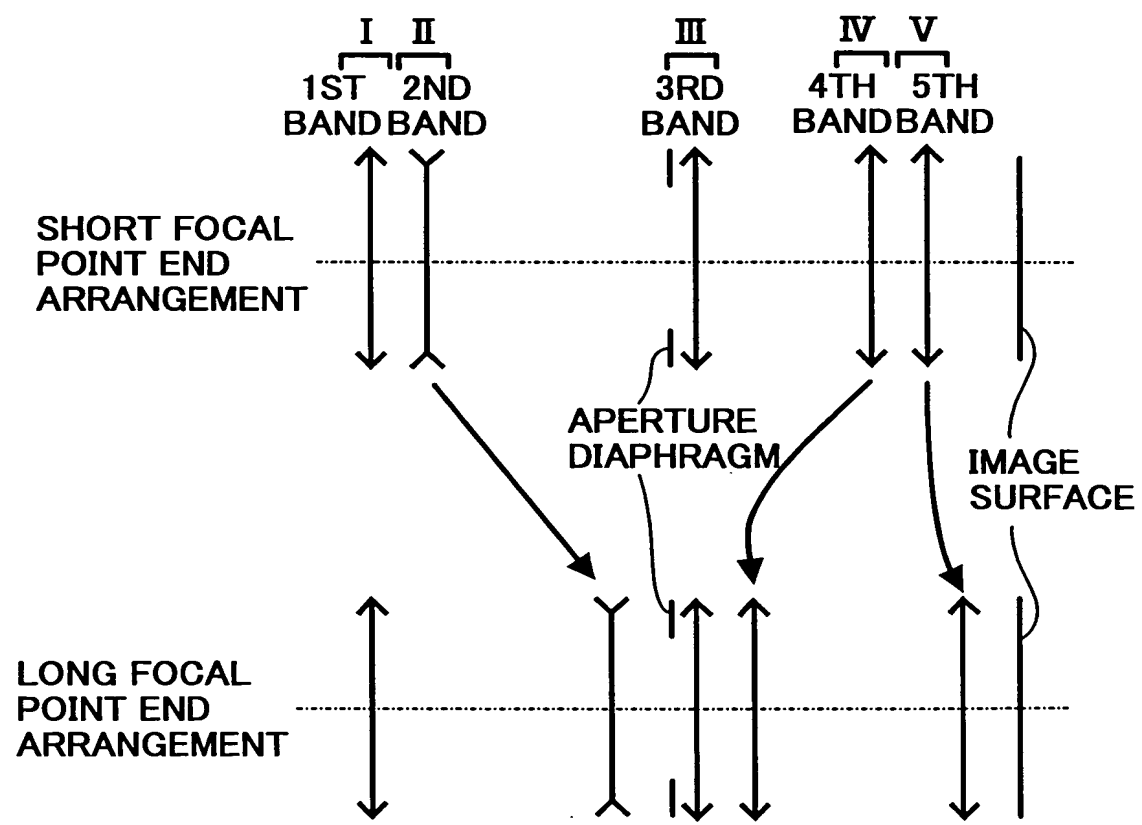


FIG. 2

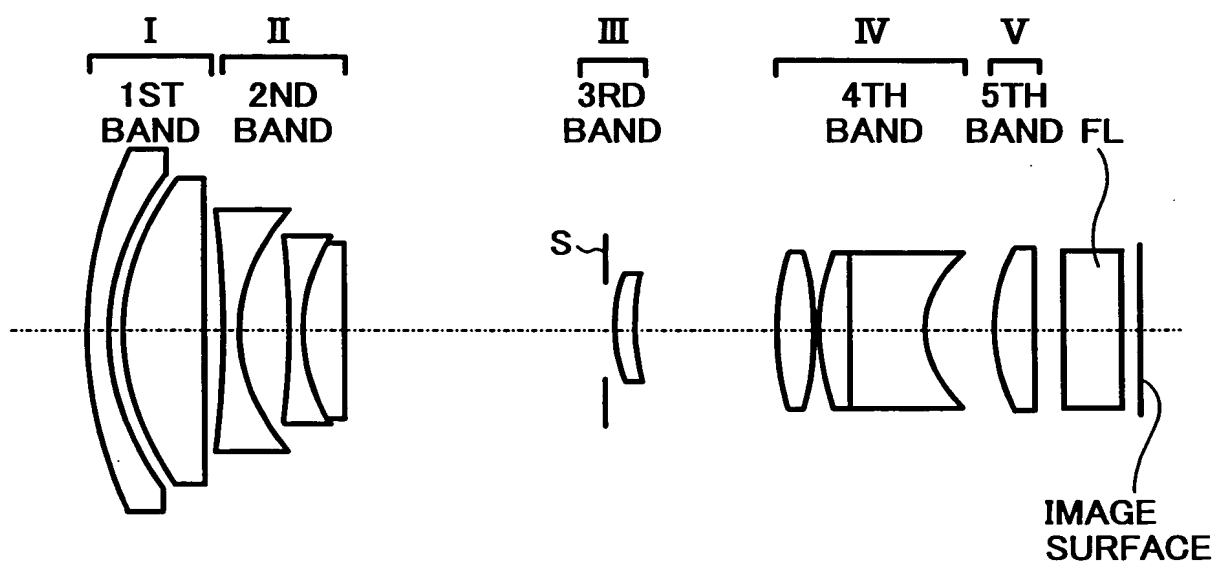


FIG. 3

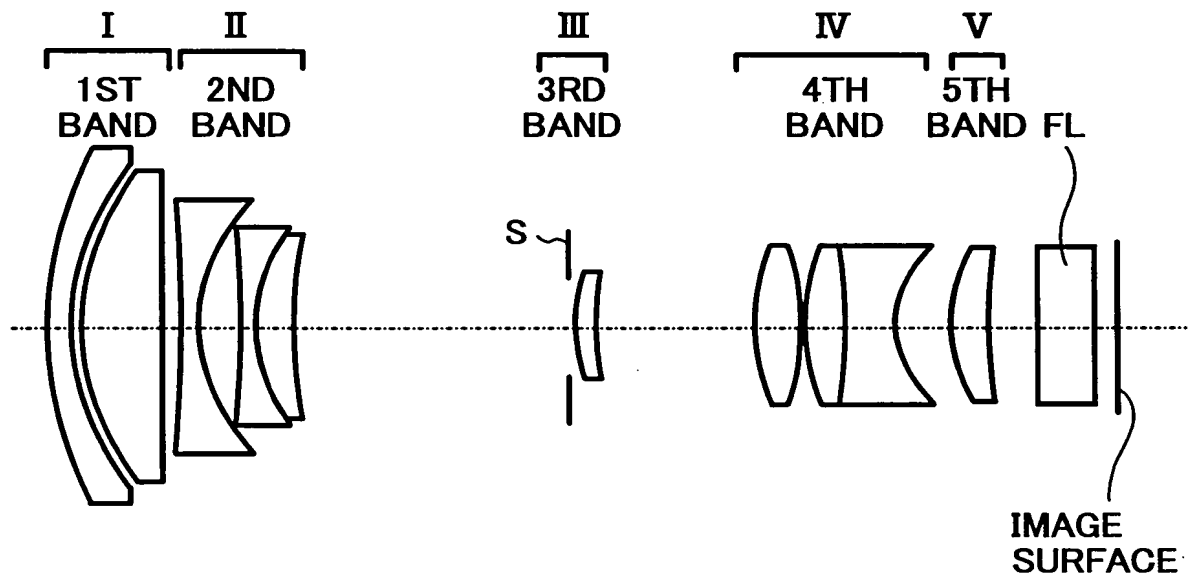


FIG. 4

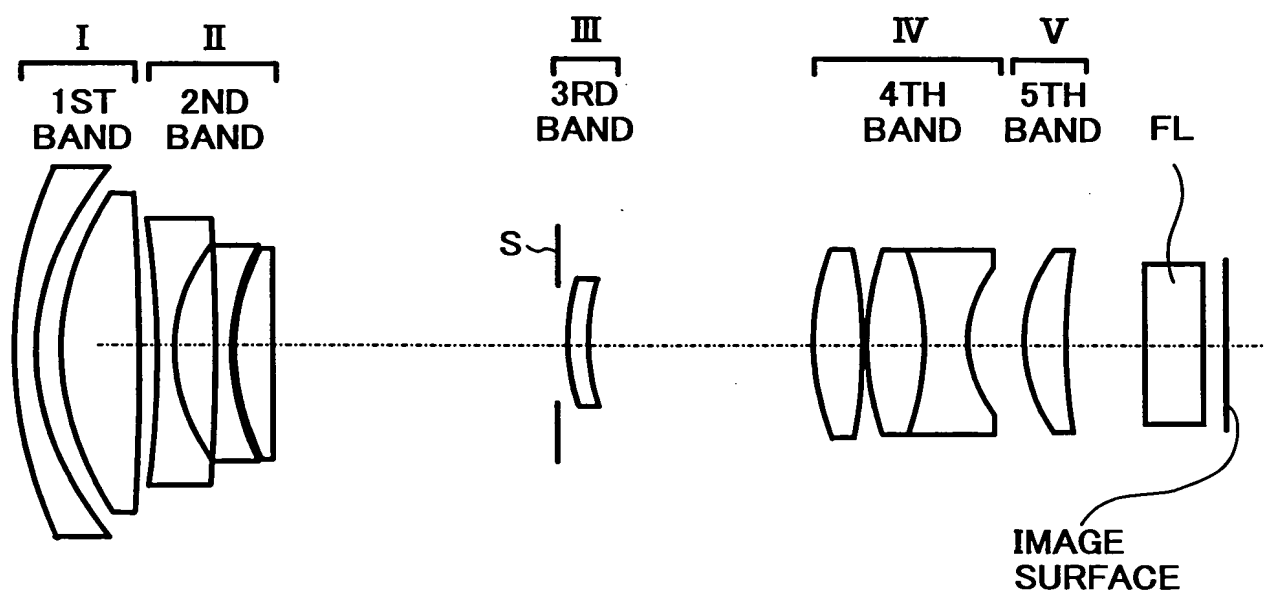


FIG. 5

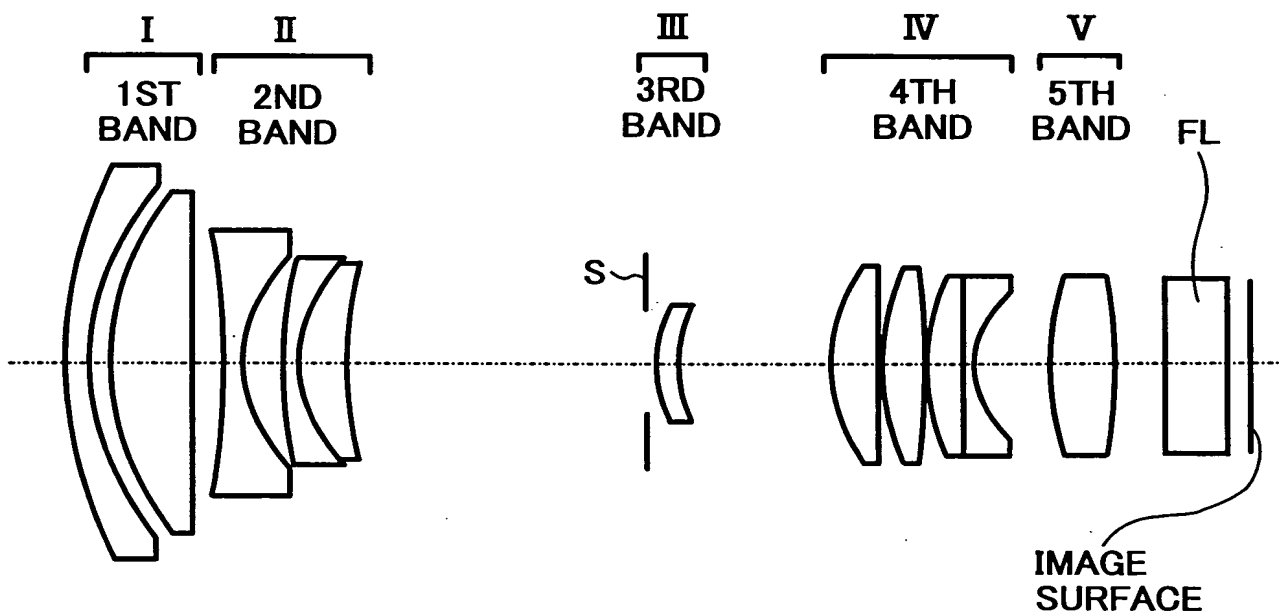


FIG. 6

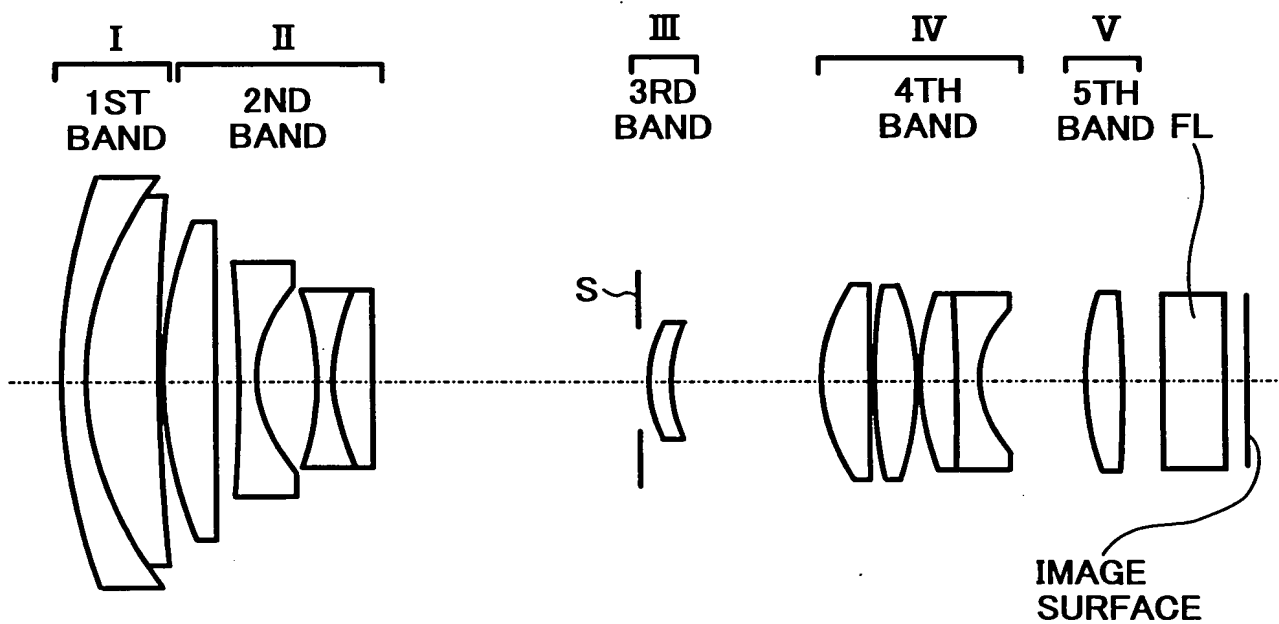
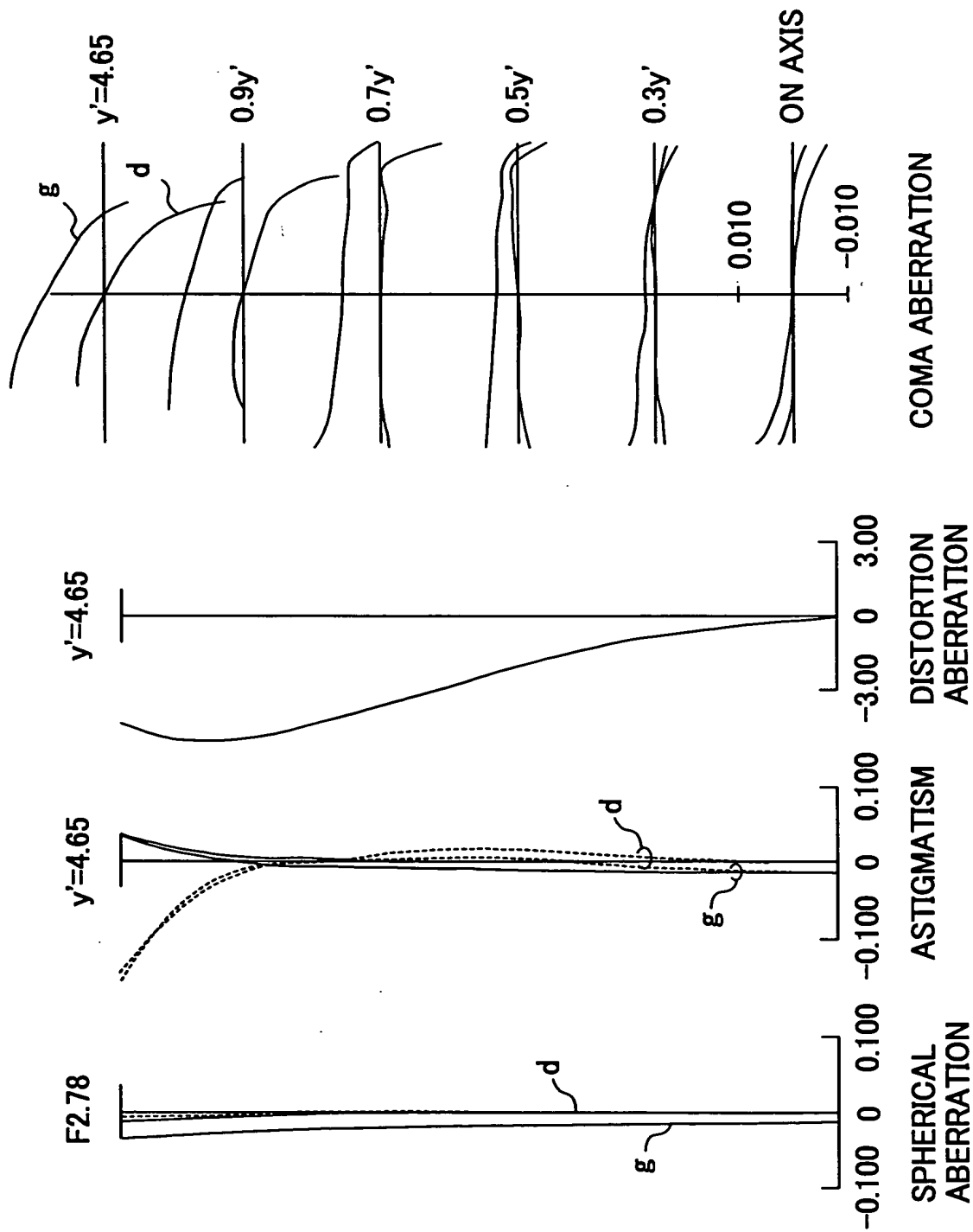


FIG. 7

SHORT FOCAL POINT END EXP. 1





# FIG. 8

MIDDLE FOCAL LENGTH EXP. 1

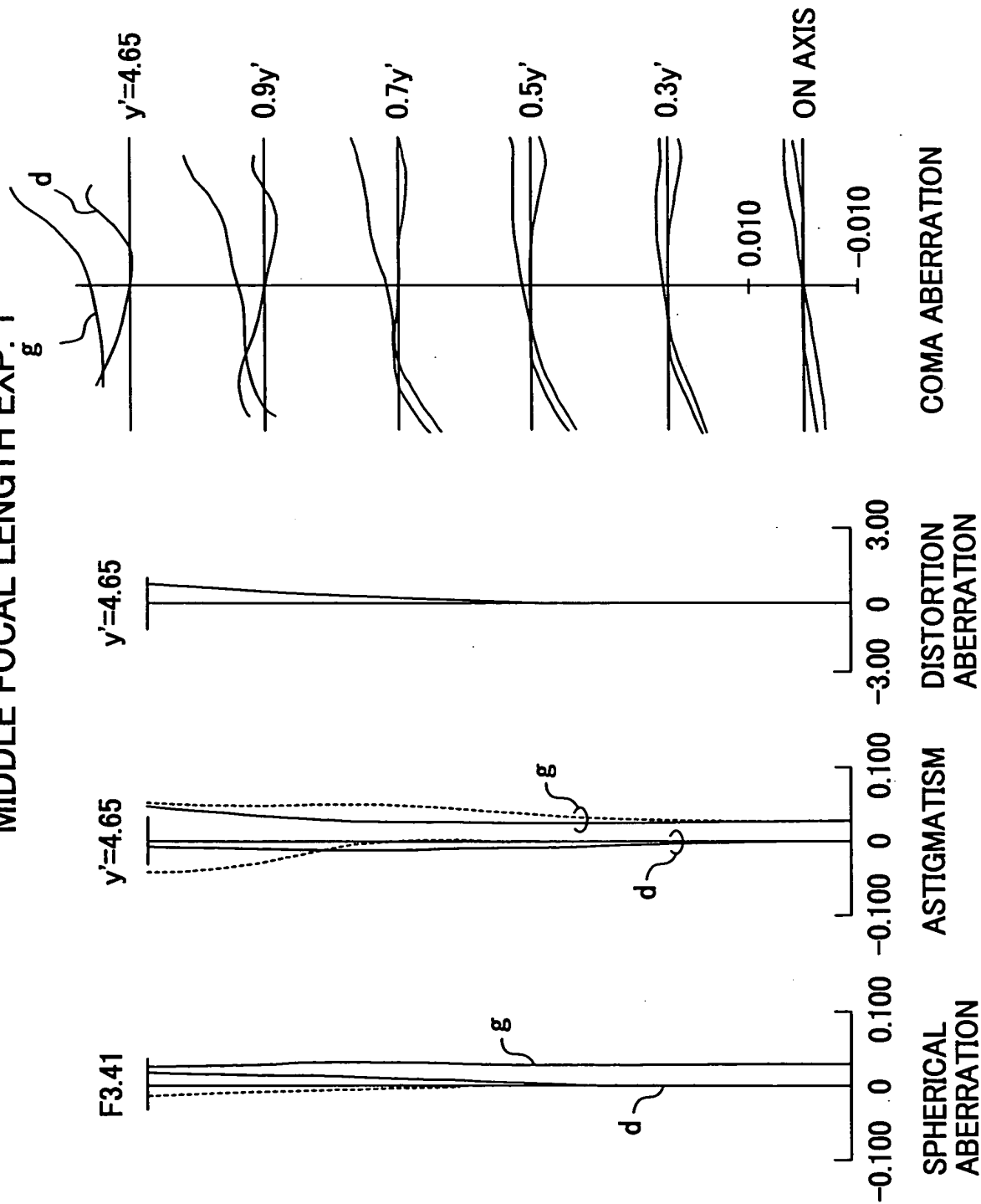
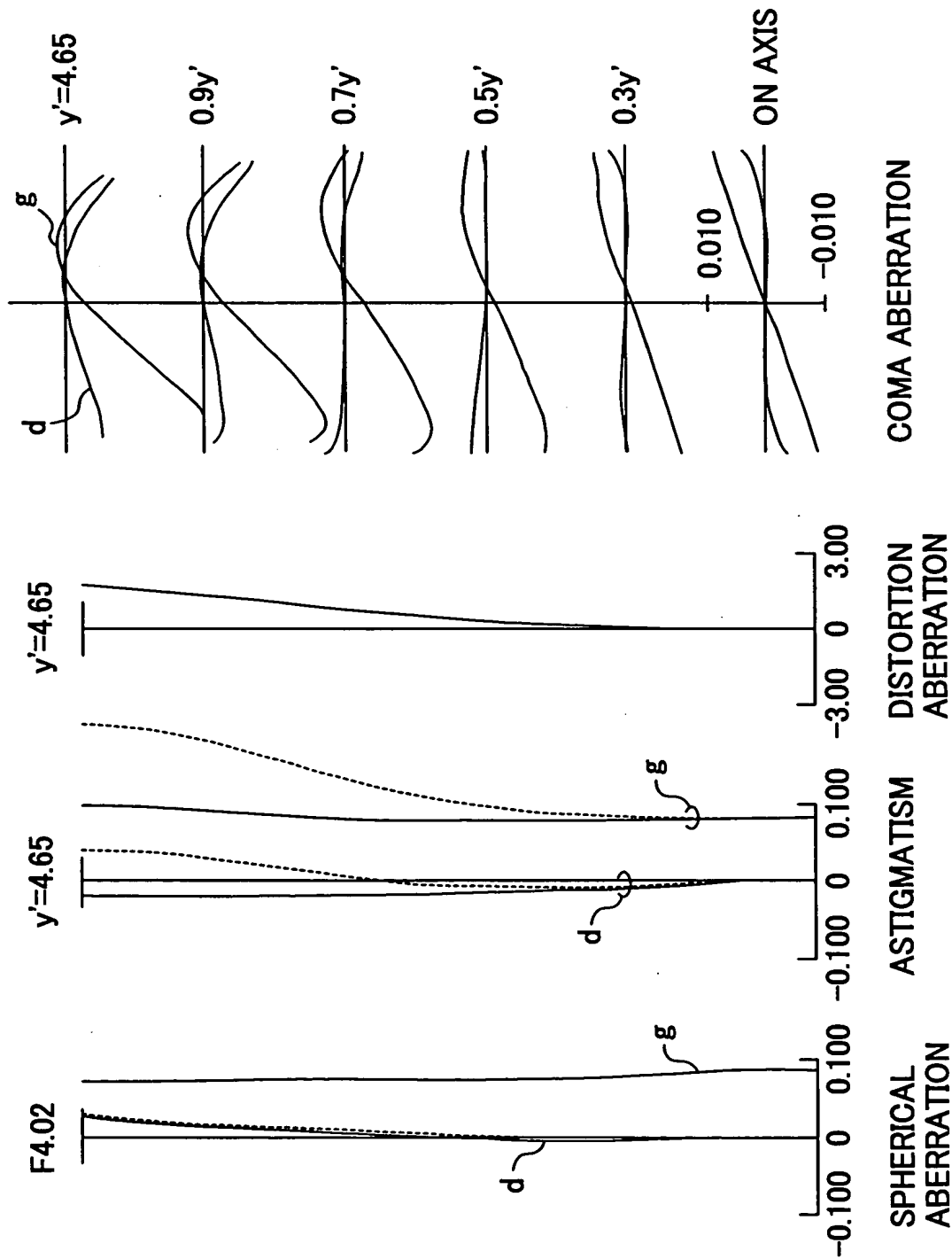


FIG. 9

LONG FOCAL POINT END EXP.1



# FIG. 10

SHORT FOCAL POINT END EXP.2

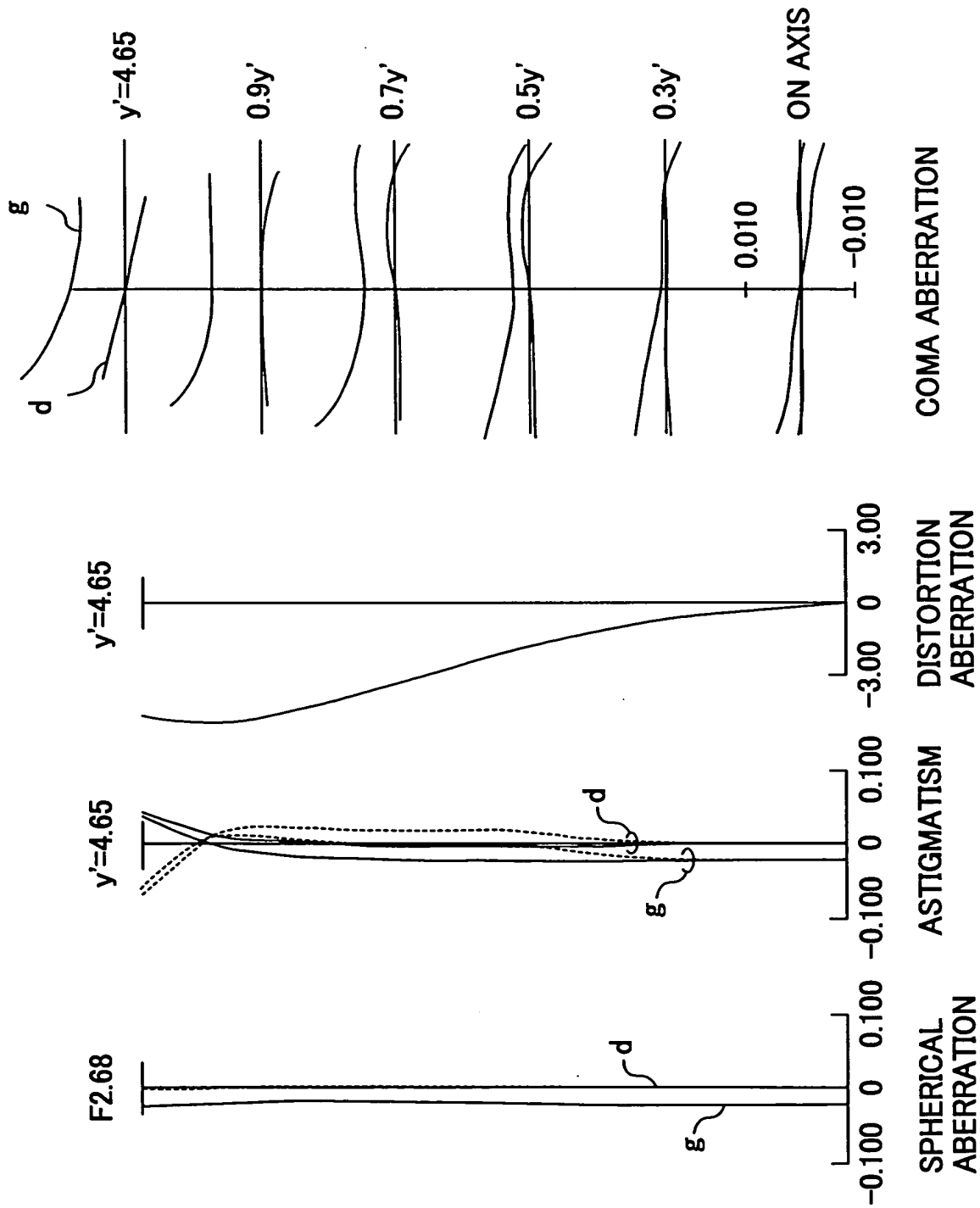
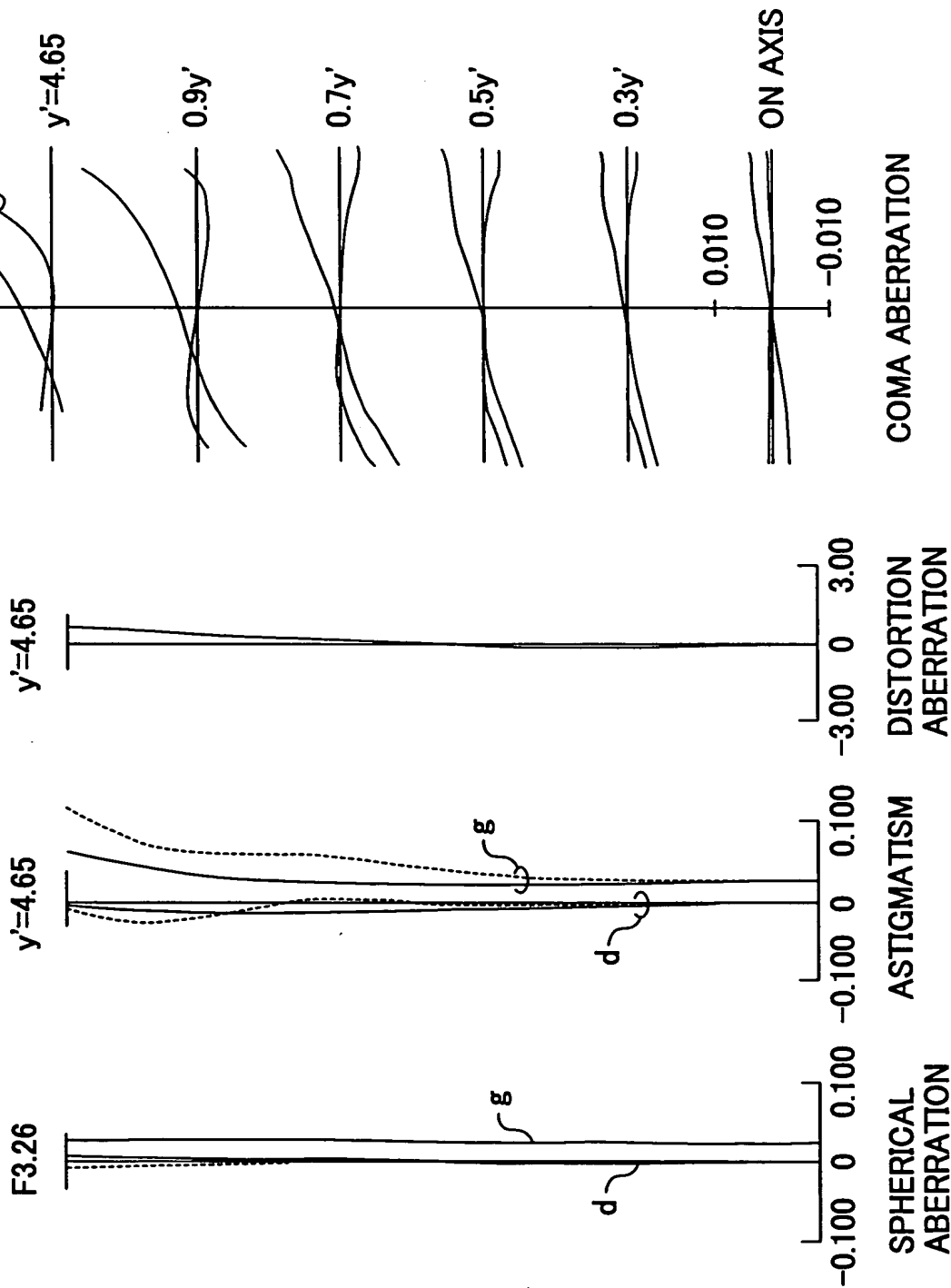


FIG. 11

MIDDLE FOCAL LENGTH EXP.2



**FIG. 12**  
LONG FOCAL POINT END EXP.2

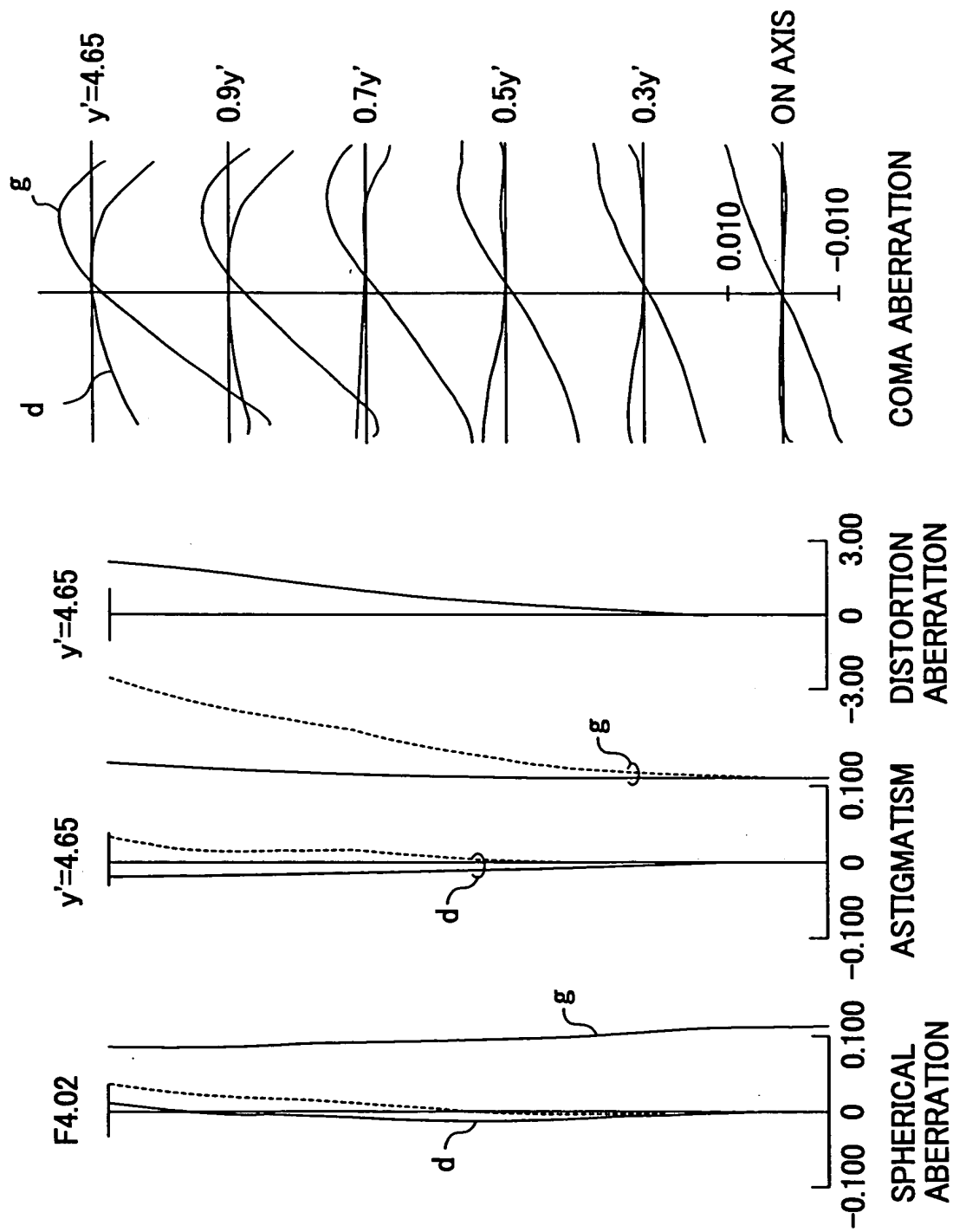


FIG. 13

SHORT FOCAL POINT END EXP.3

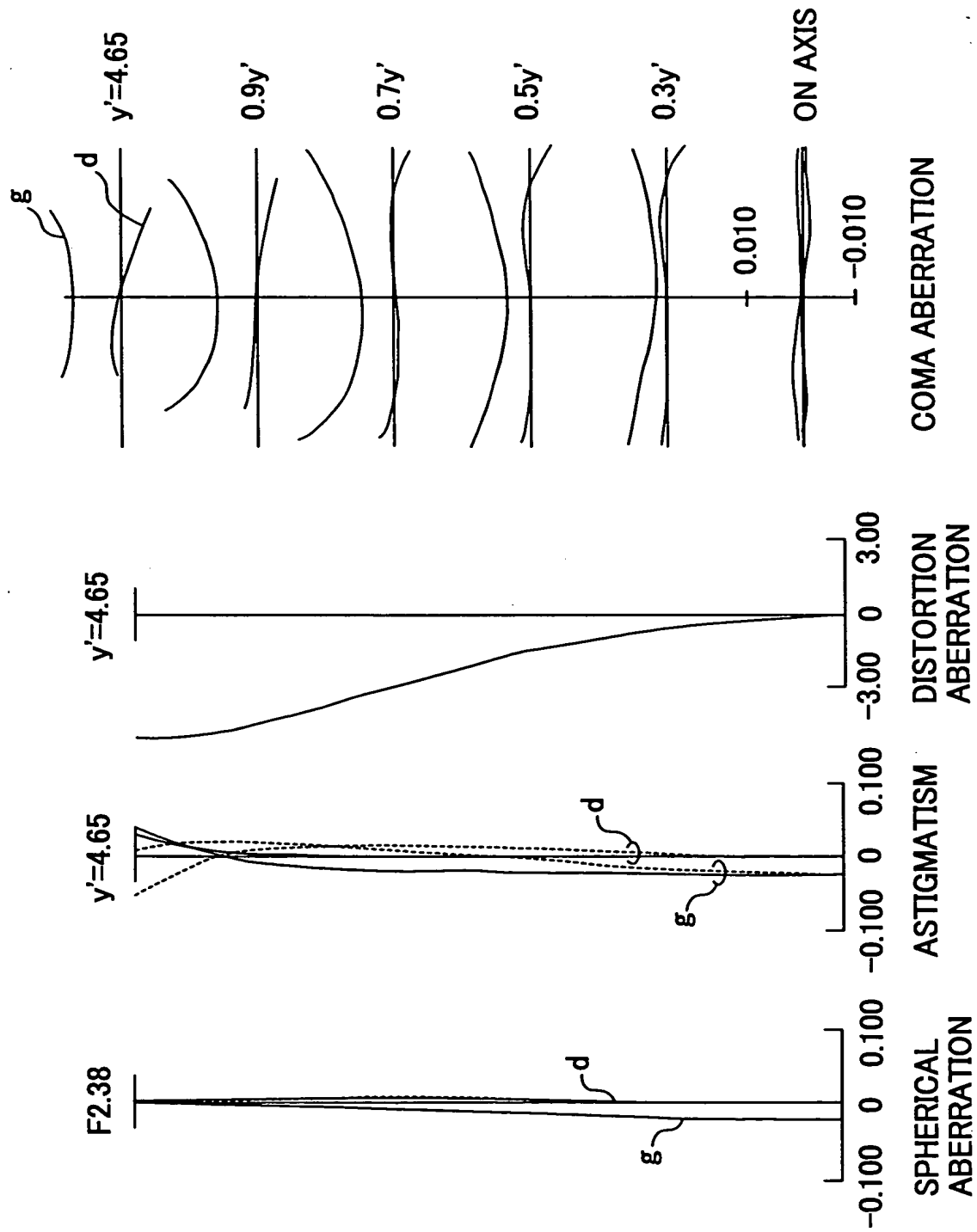


FIG. 14

MIDDLE FOCAL LENGTH EXP.3

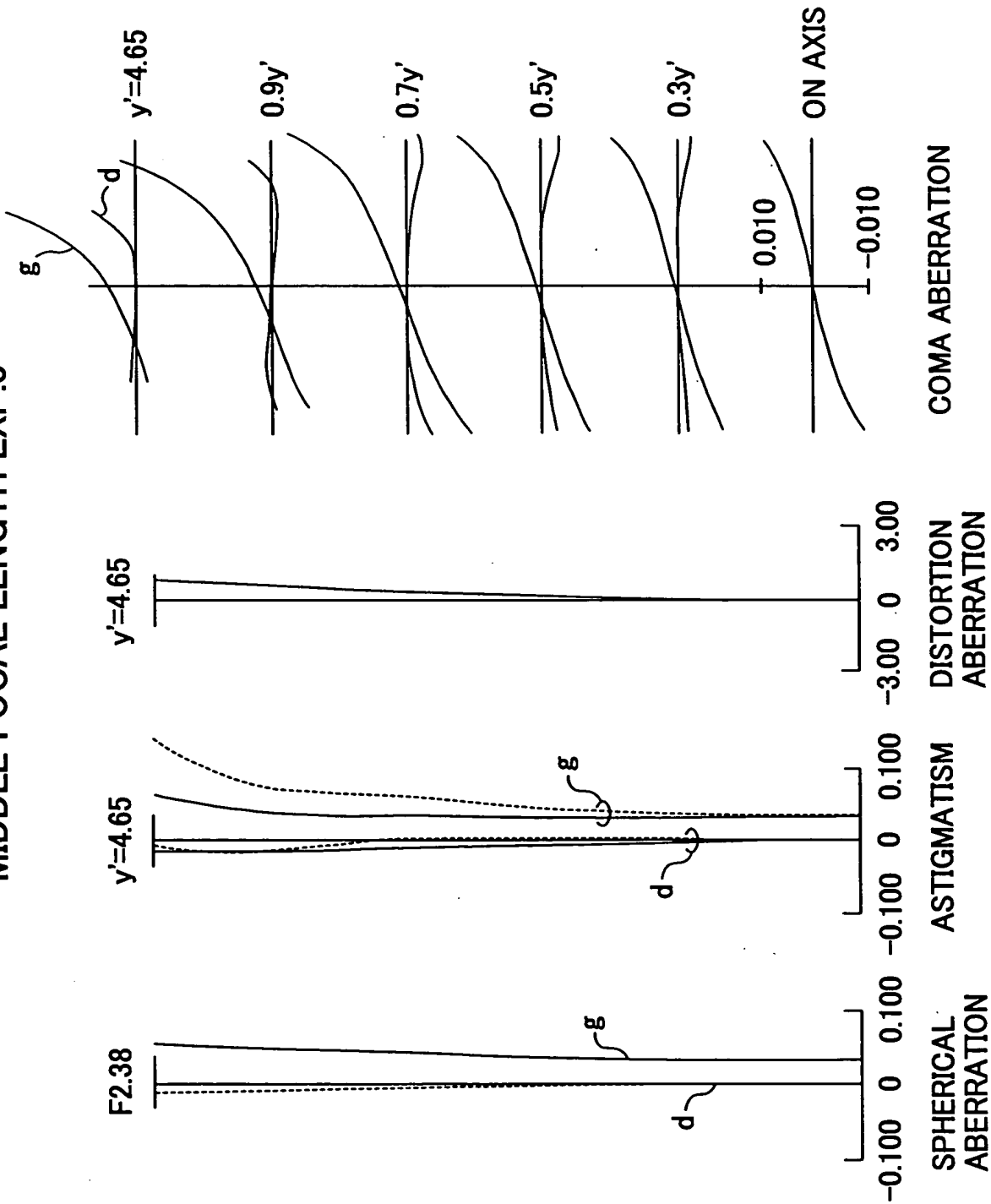


FIG. 15

LONG FOCAL POINT END EXP.3

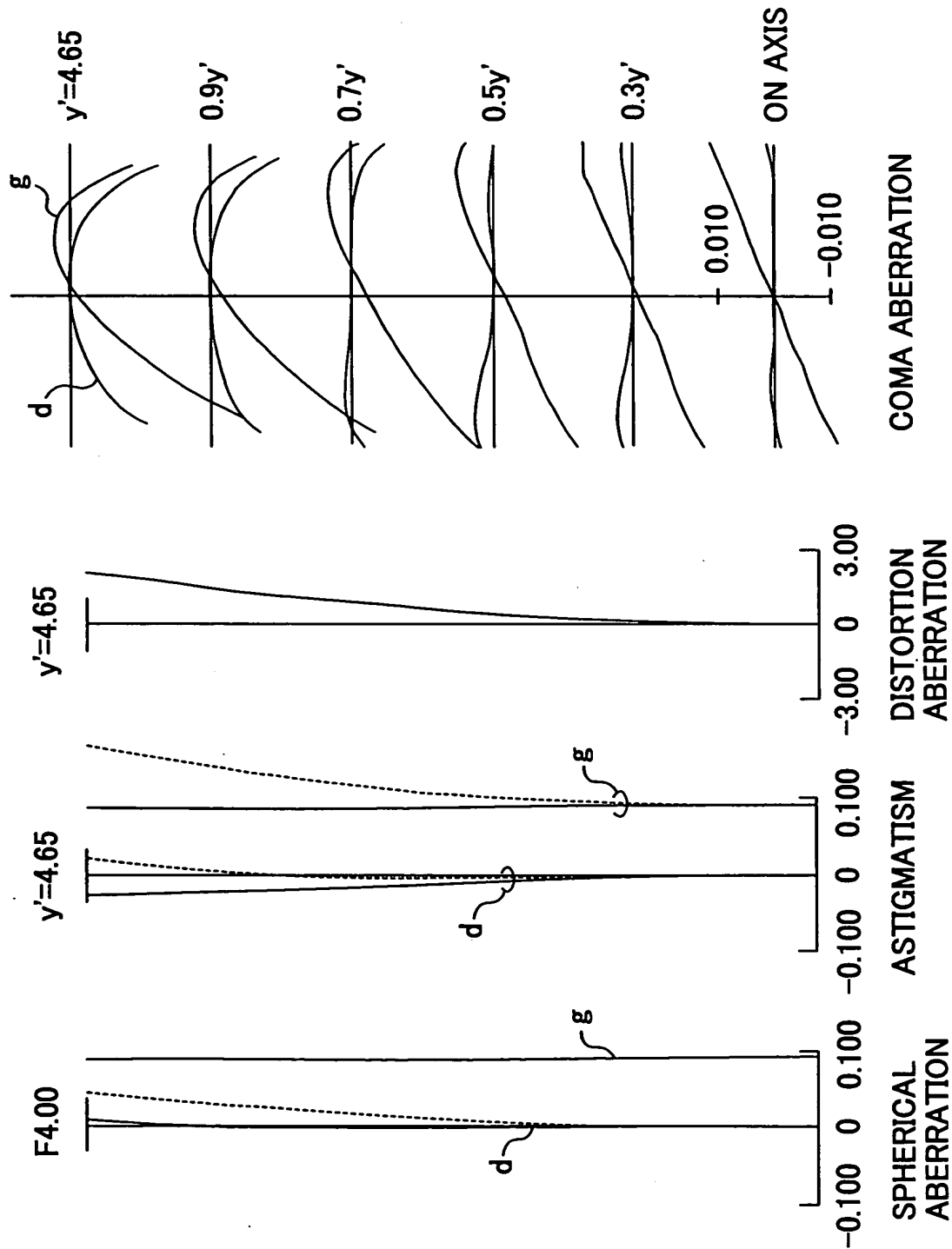




FIG. 16  
SHORT FOCAL POINT END EXP.4

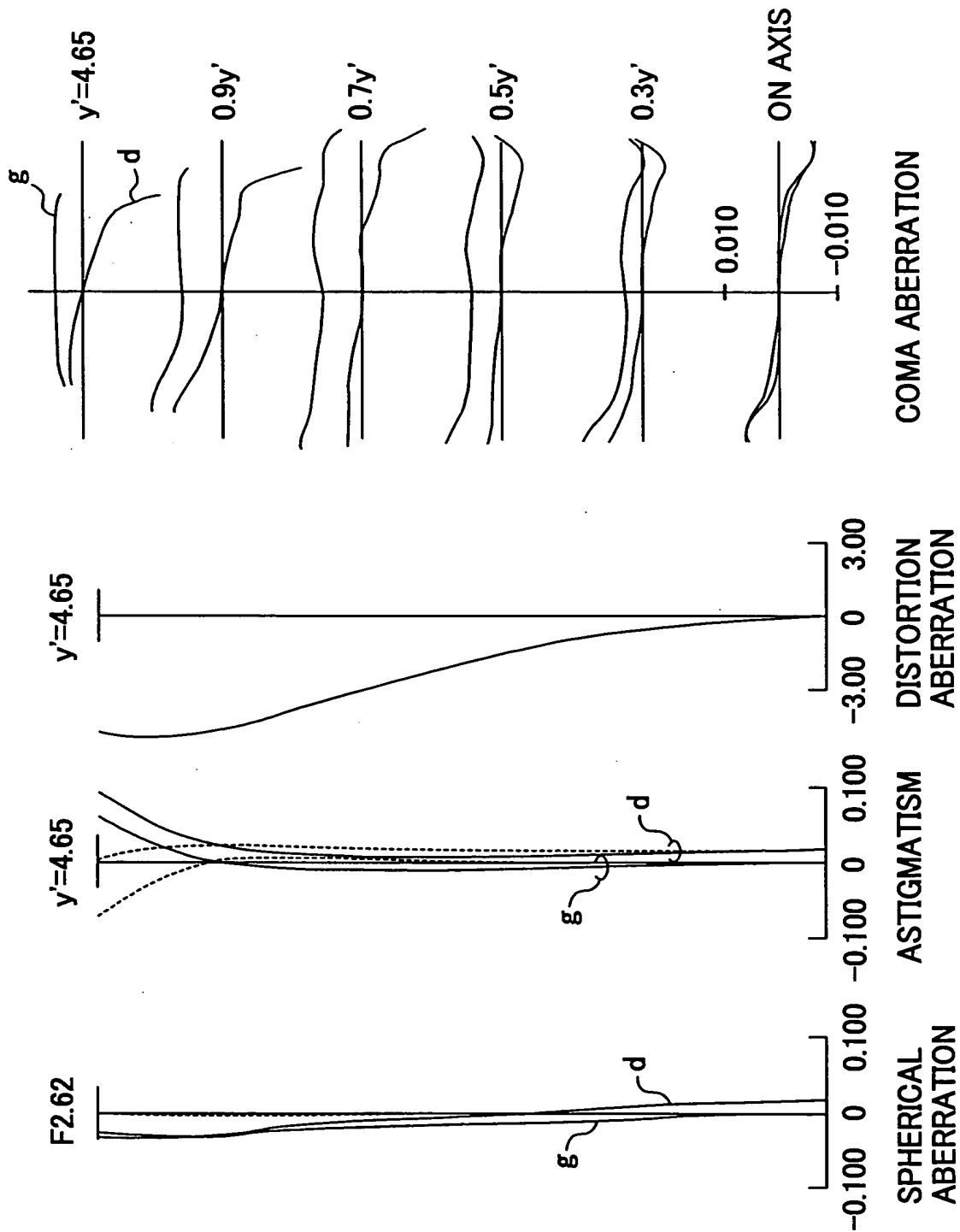
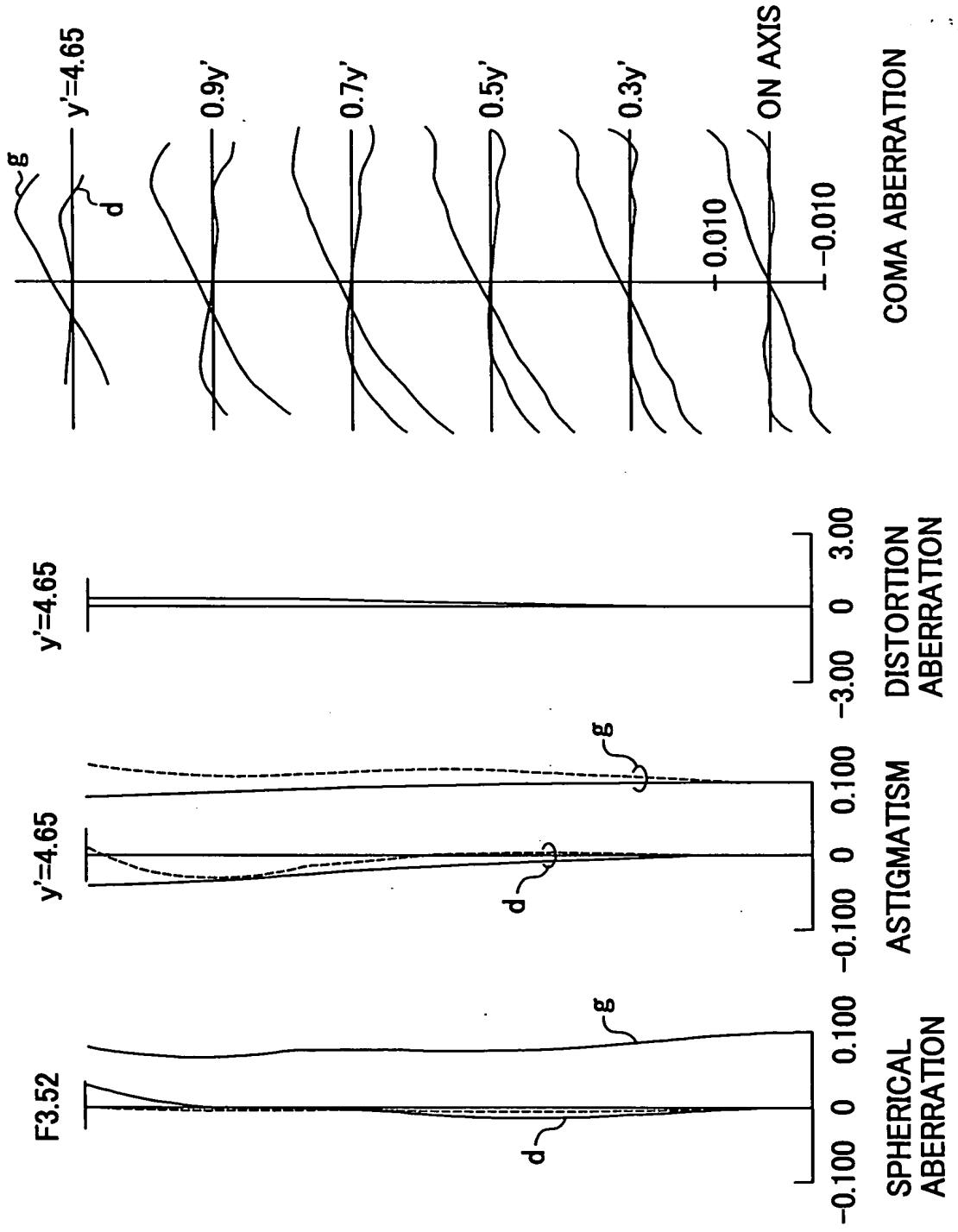
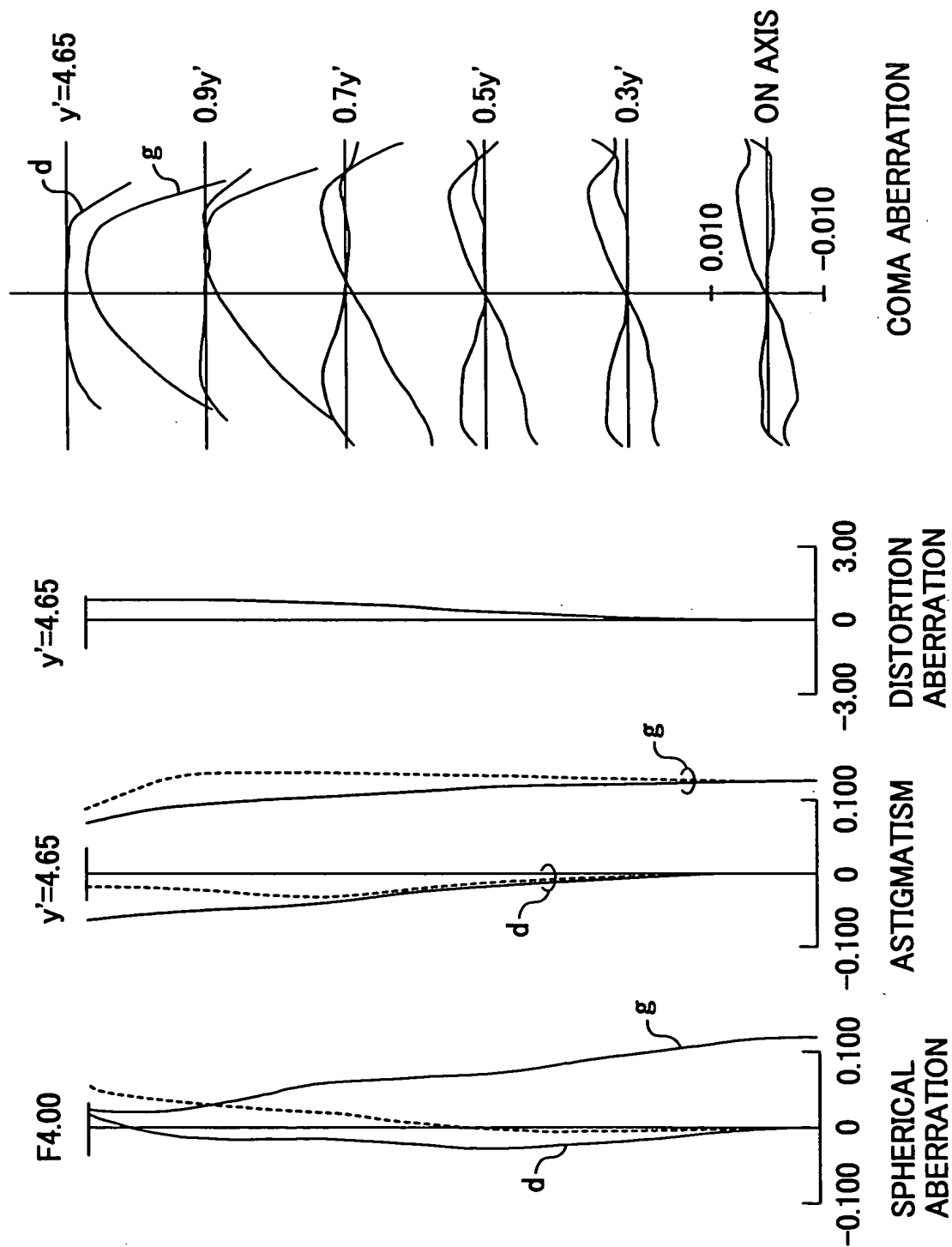


FIG. 17  
MIDDLE FOCAL LENGTH EXP.4



**FIG. 18**  
LONG FOCAL POINT END EXP.4



# FIG. 19

SHORT FOCAL POINT END EXP.5

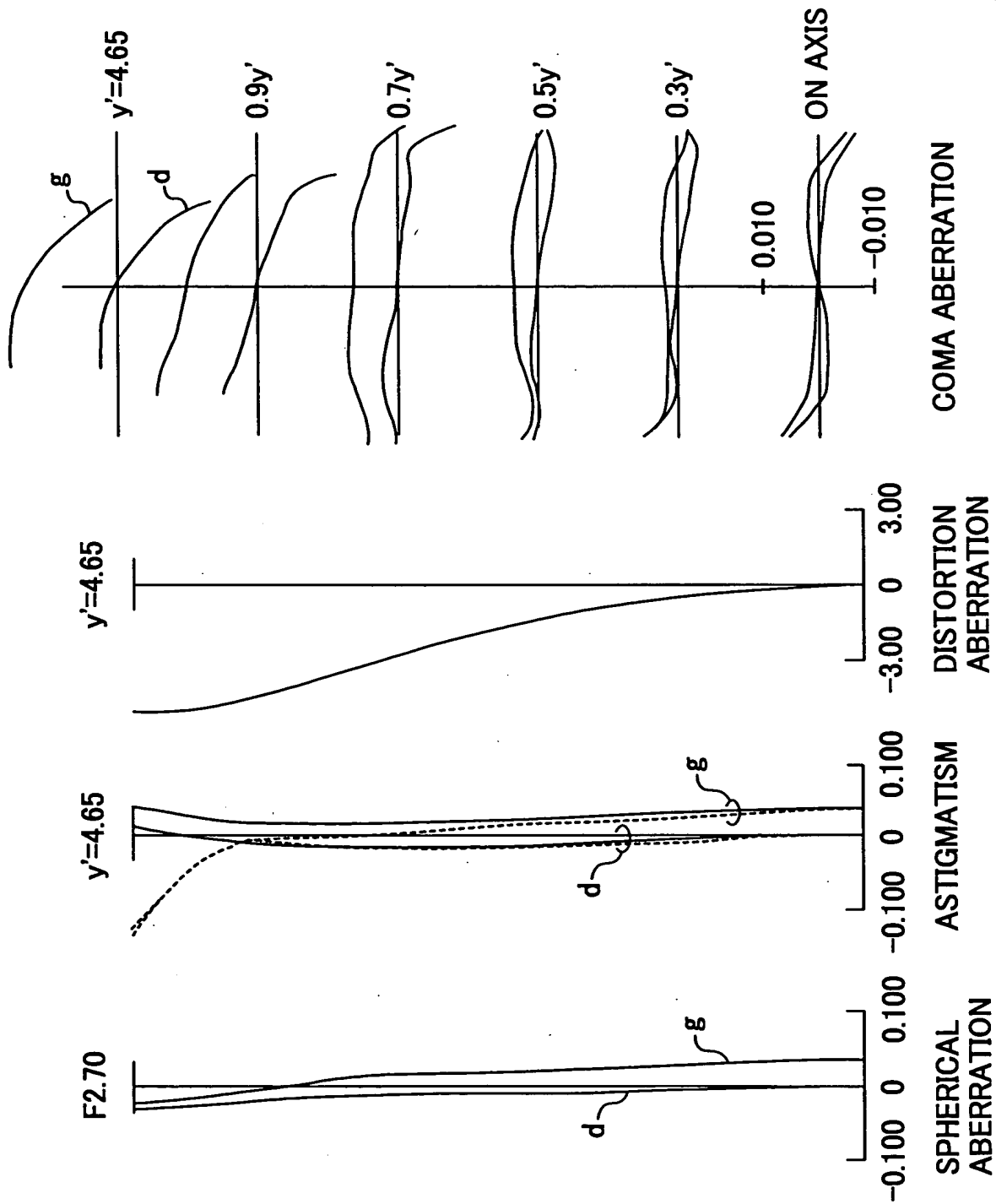
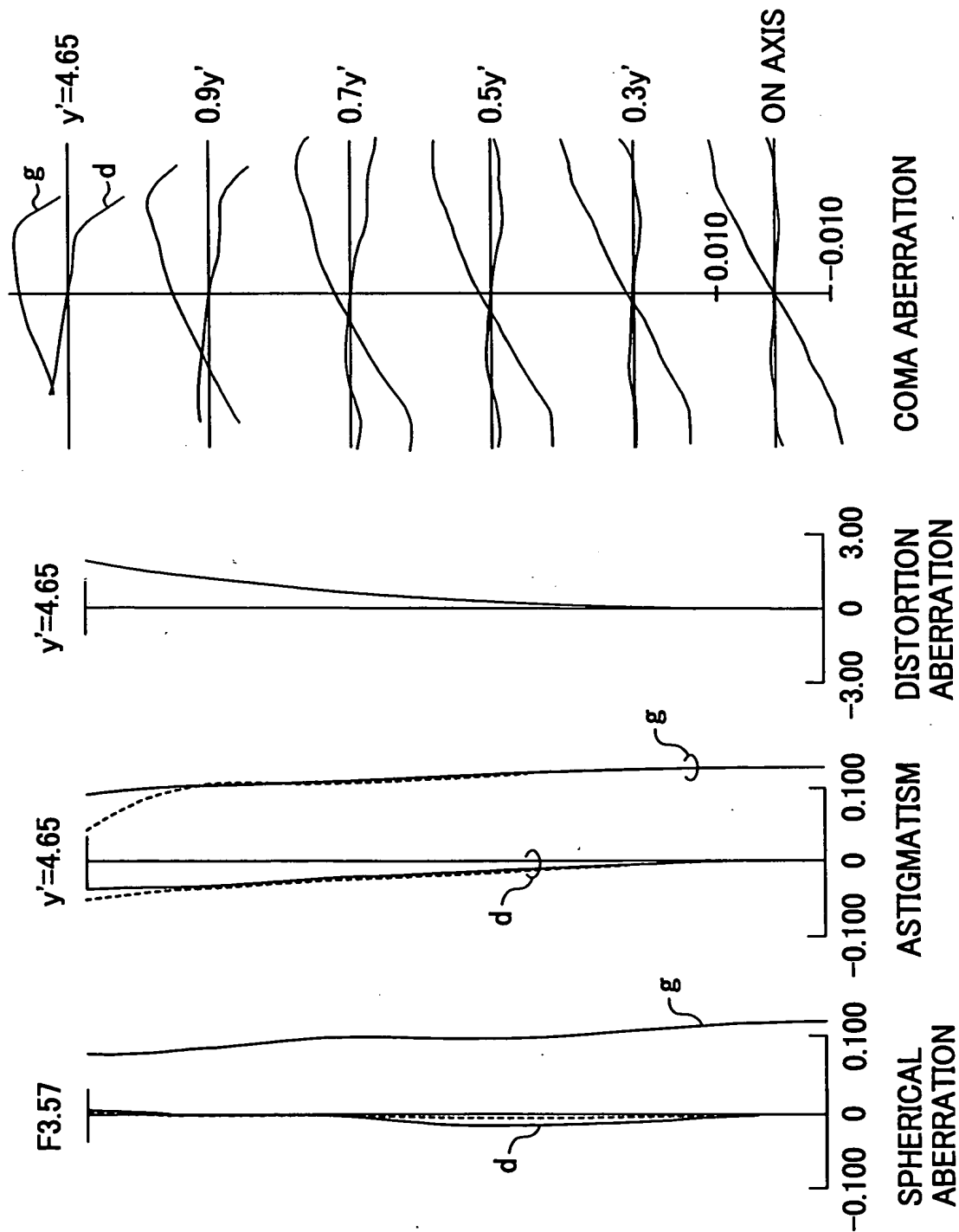


FIG. 20

MIDDLE FOCAL LENGTH EXP.5



# FIG. 21

LONG FOCAL POINT END EXP.5

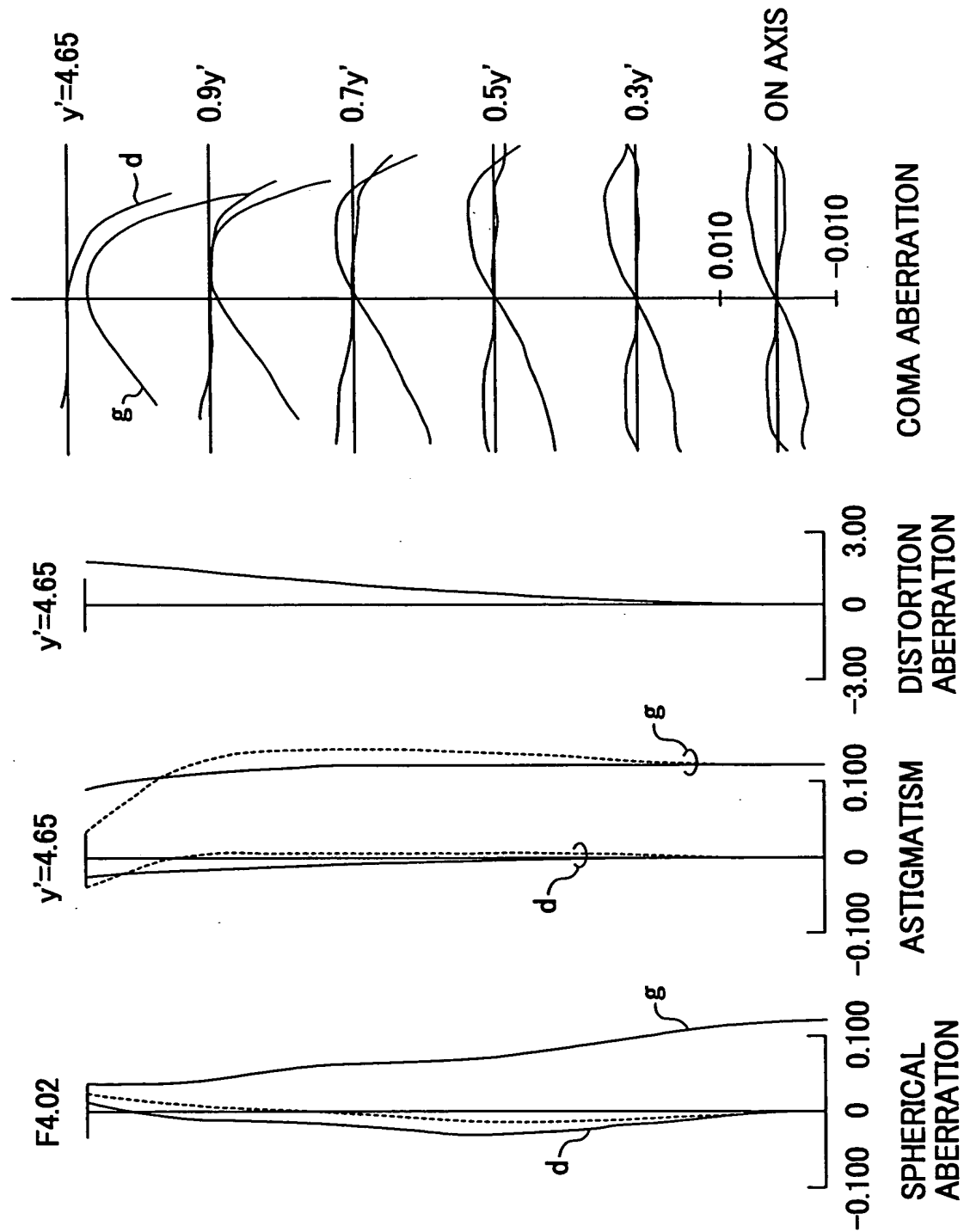


FIG. 22A

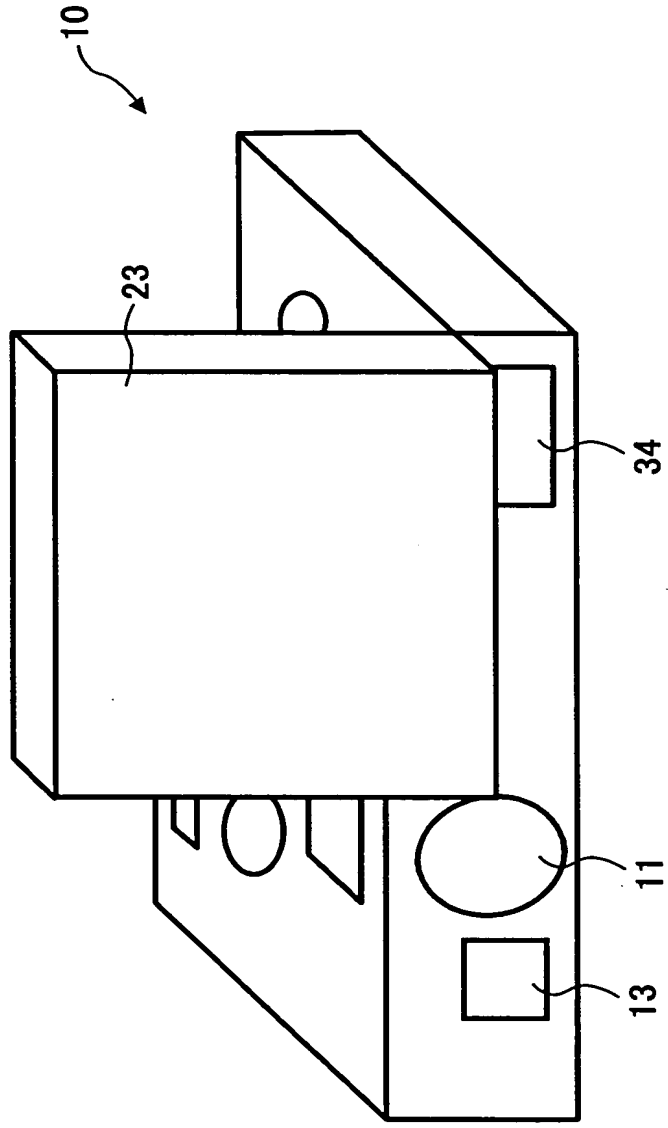


FIG. 22B

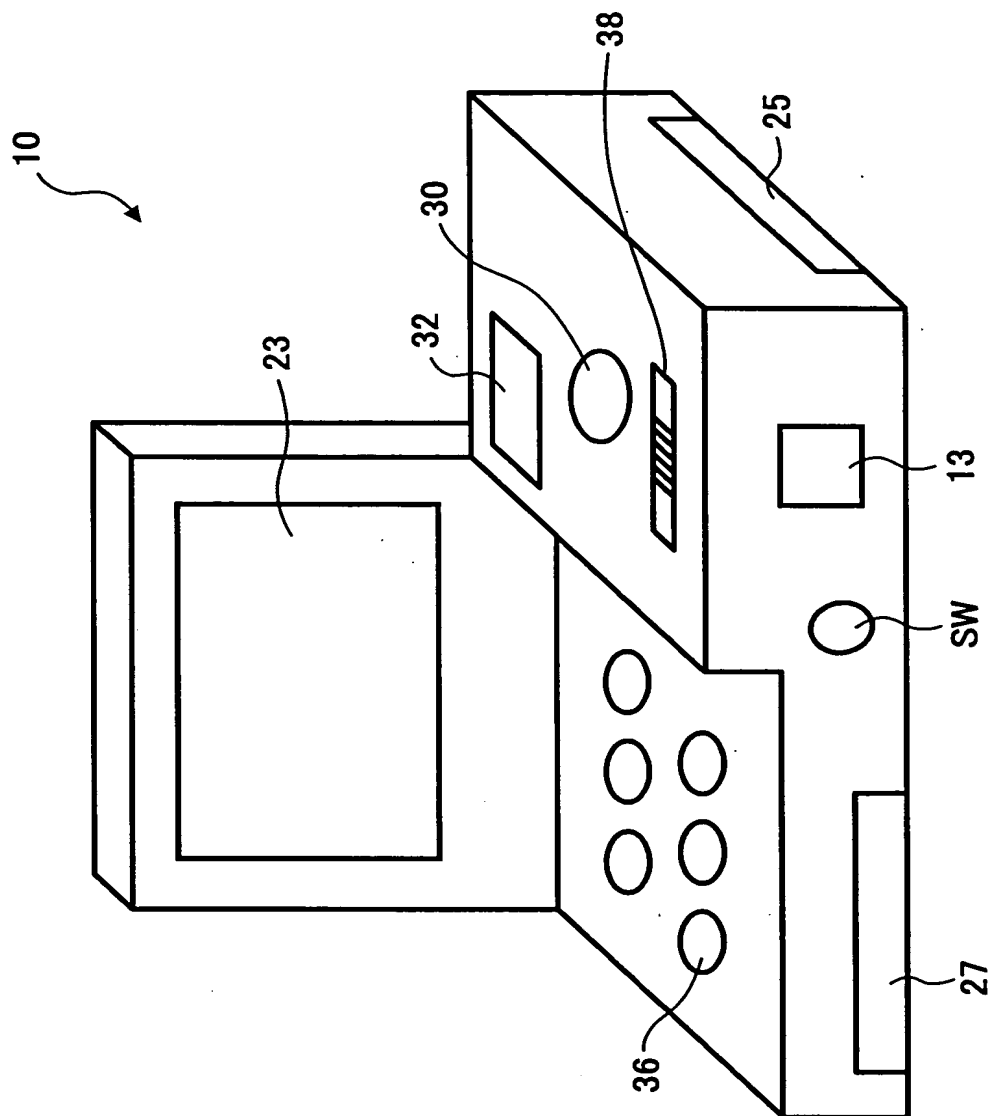




FIG. 22C

10

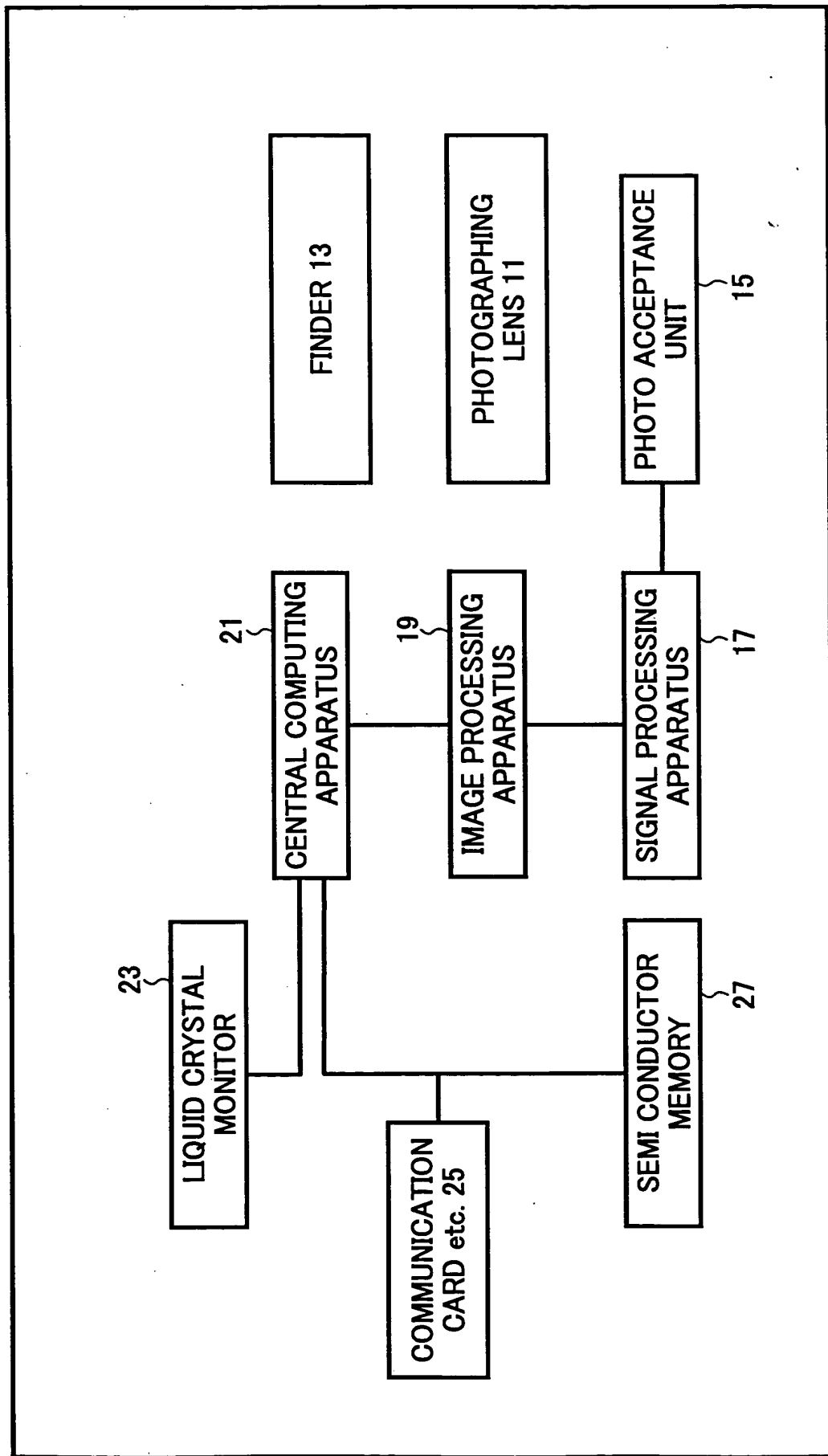
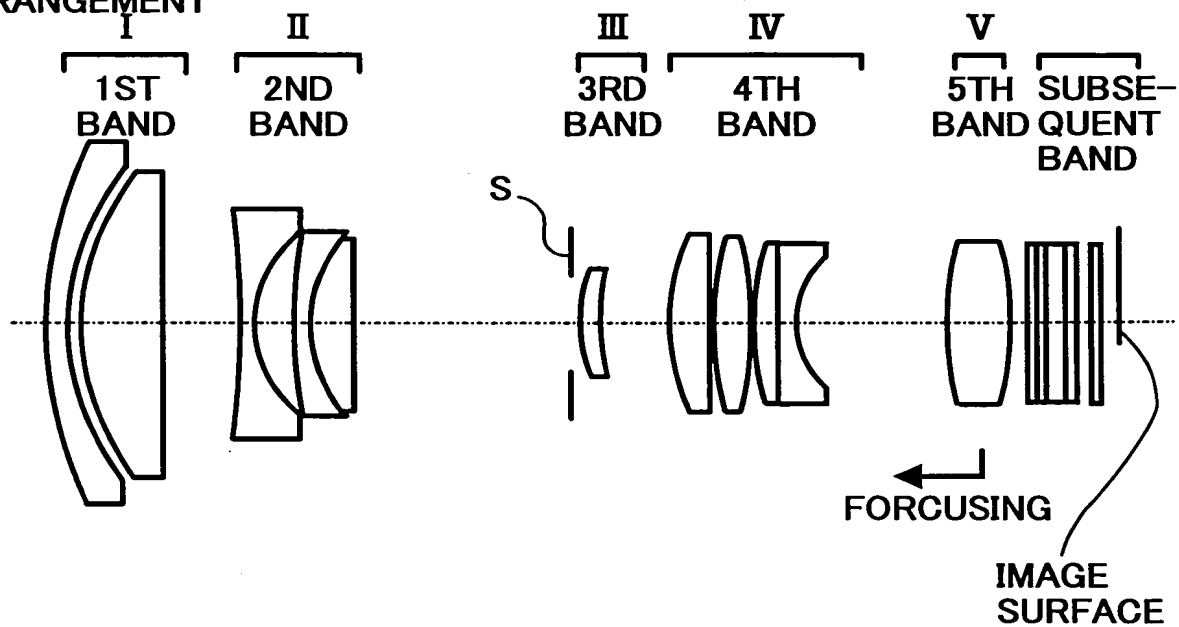


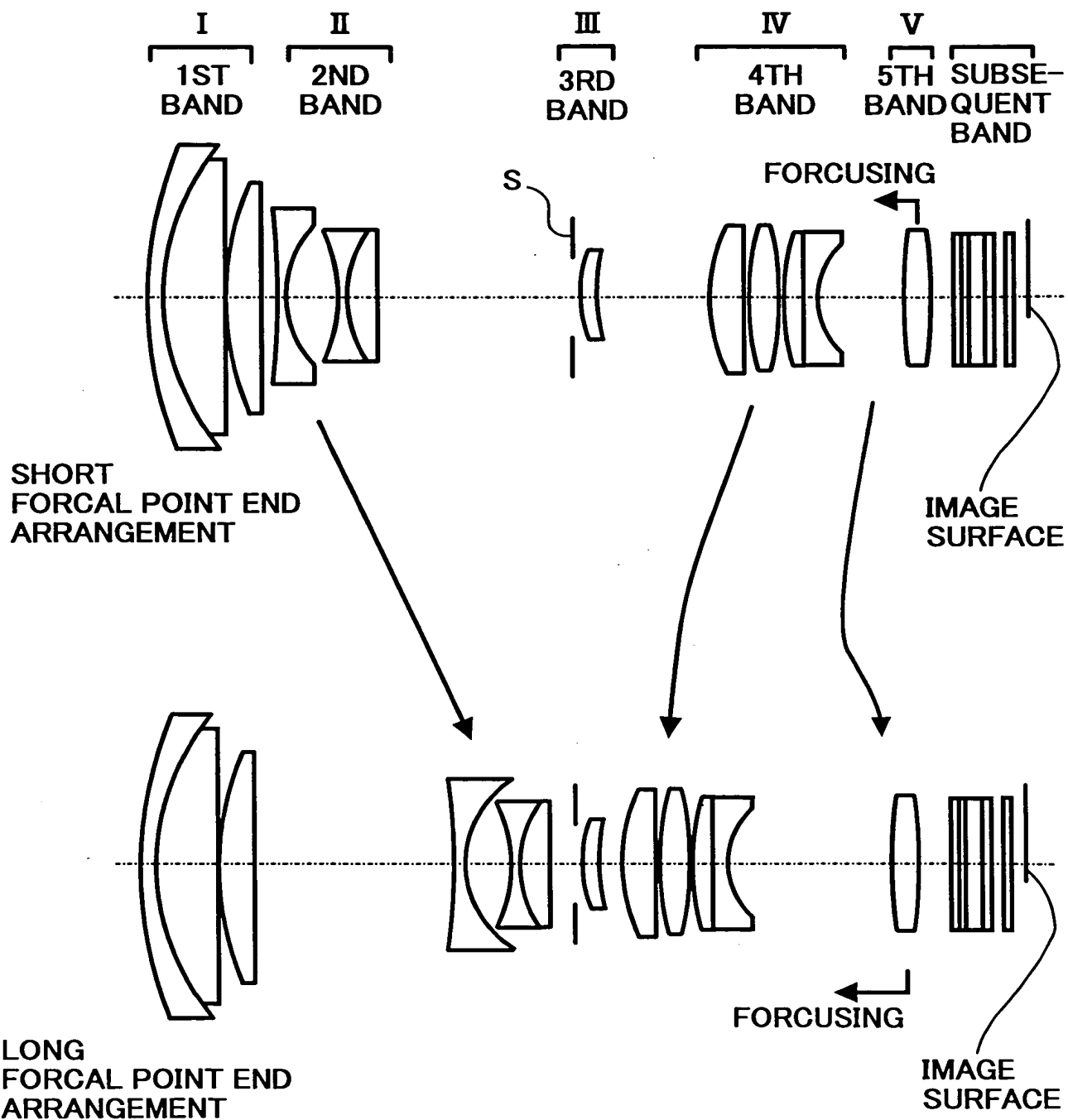


FIG. 23B

MACRO  
MODE  
ARRANGEMENT



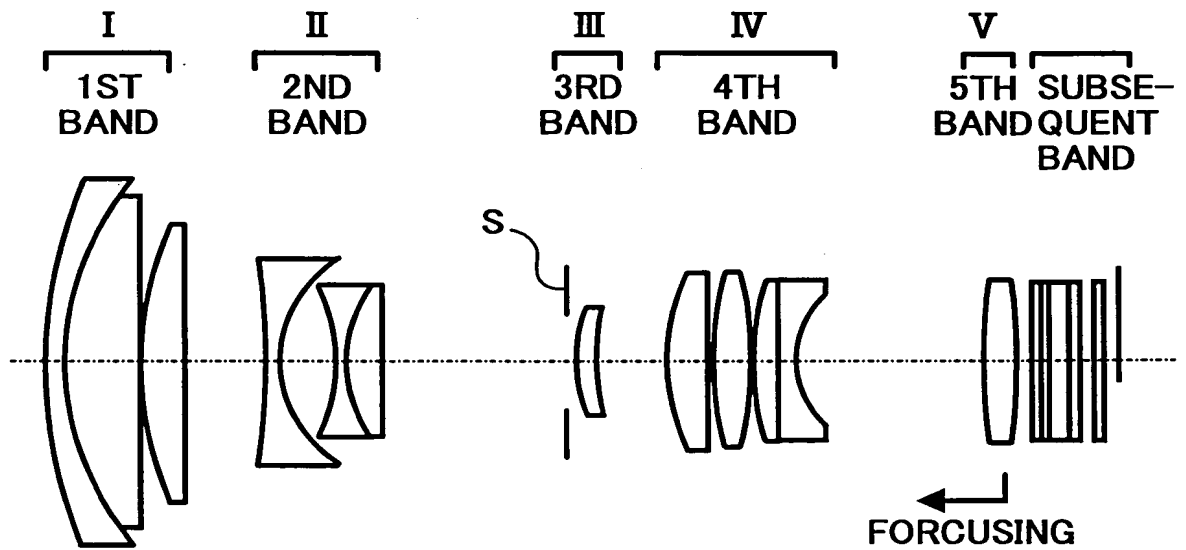
# FIG. 24A



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FIG. 24B

MACRO  
MODE  
ARRANGEMENT



**00000000000000000000000000000000**

## LONG FORCAL POINT END ARRANGEMENT

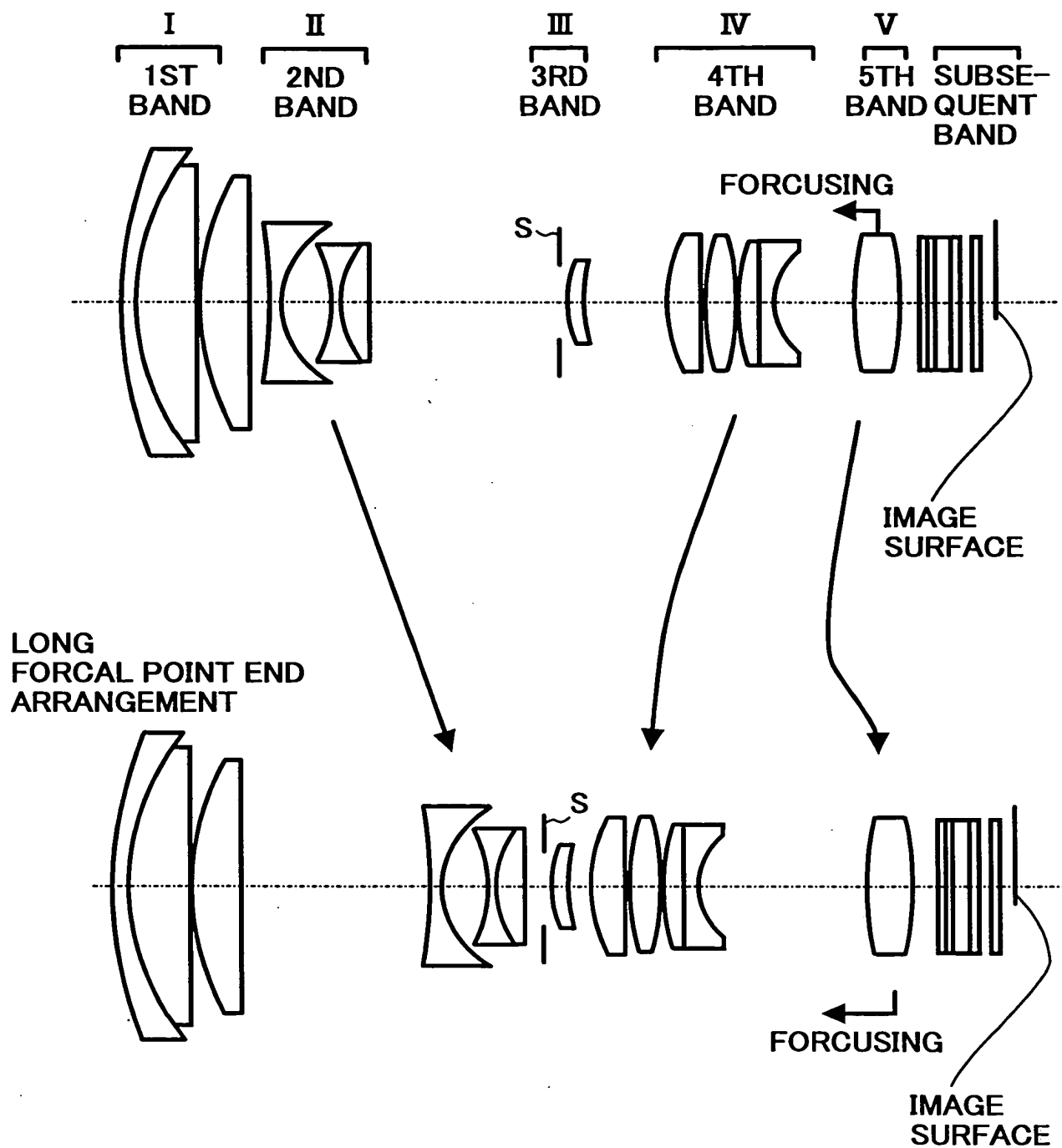


FIG. 25B

MACRO  
MODE  
ARRANGEMENT

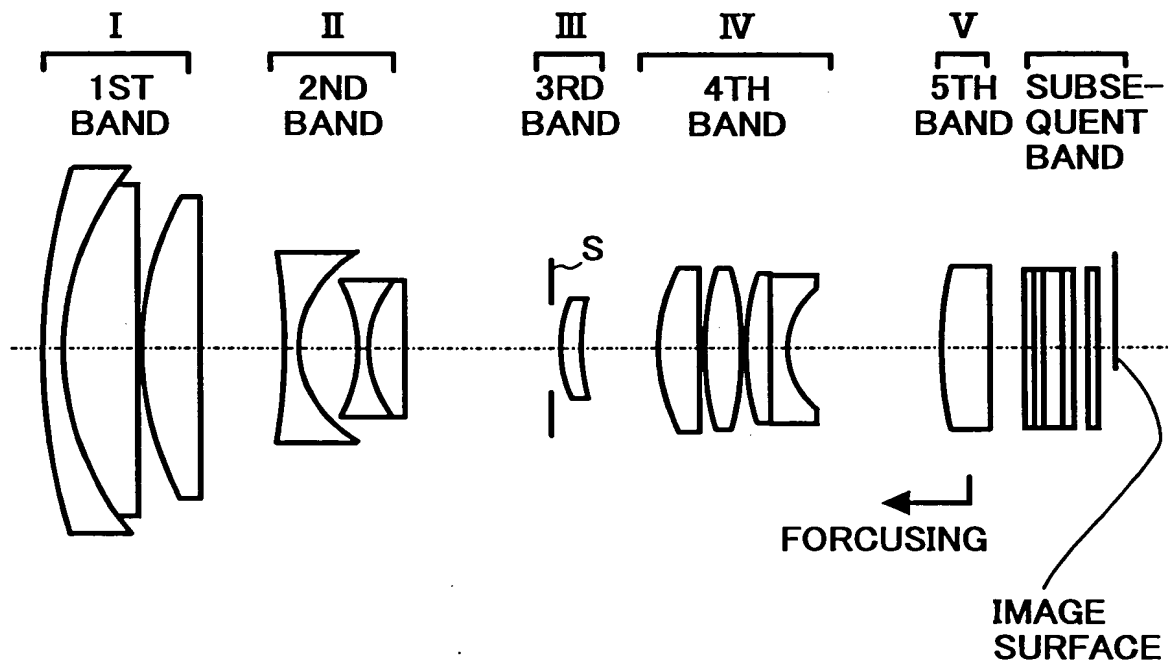


FIG. 26

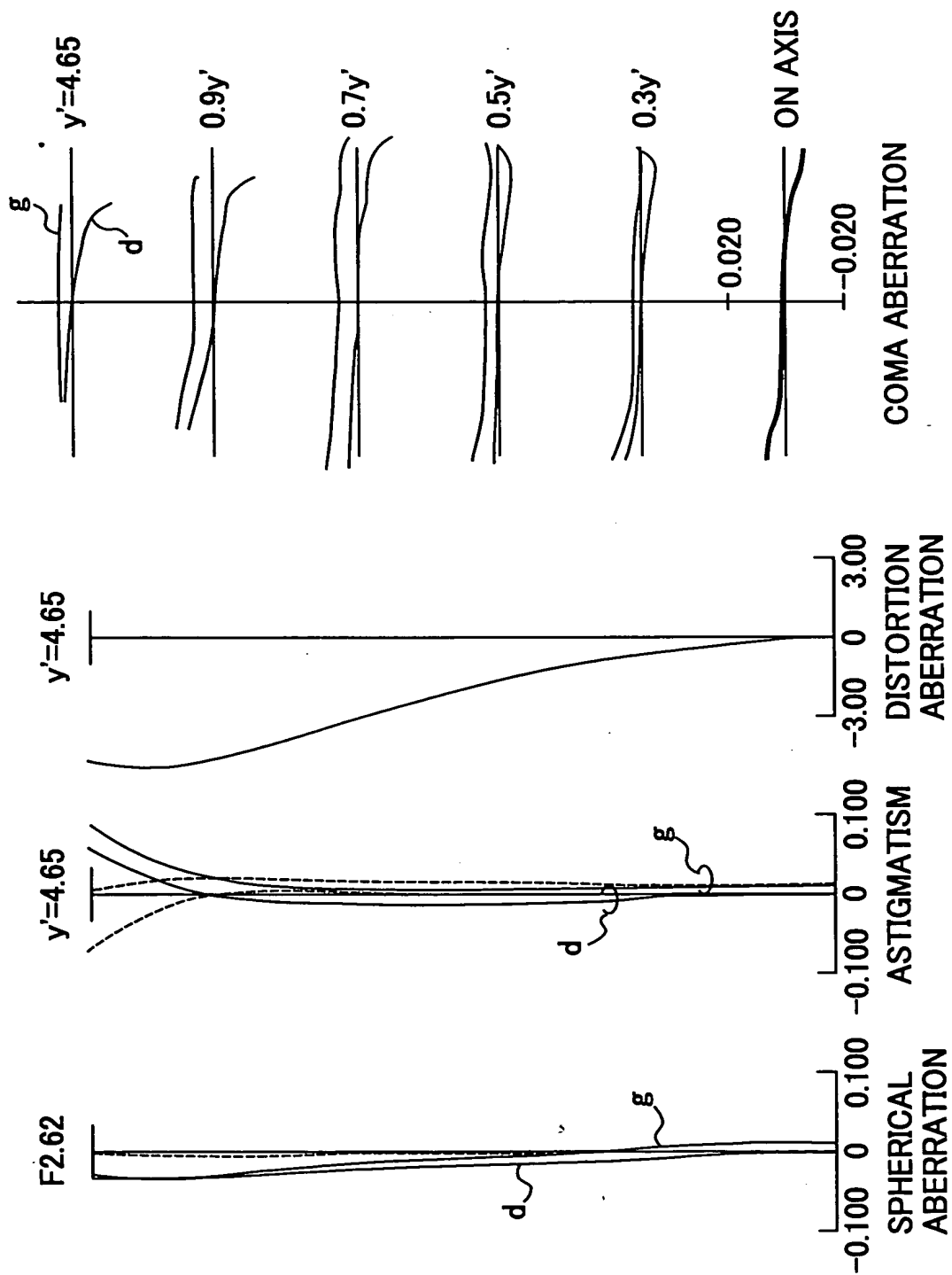




FIG. 27

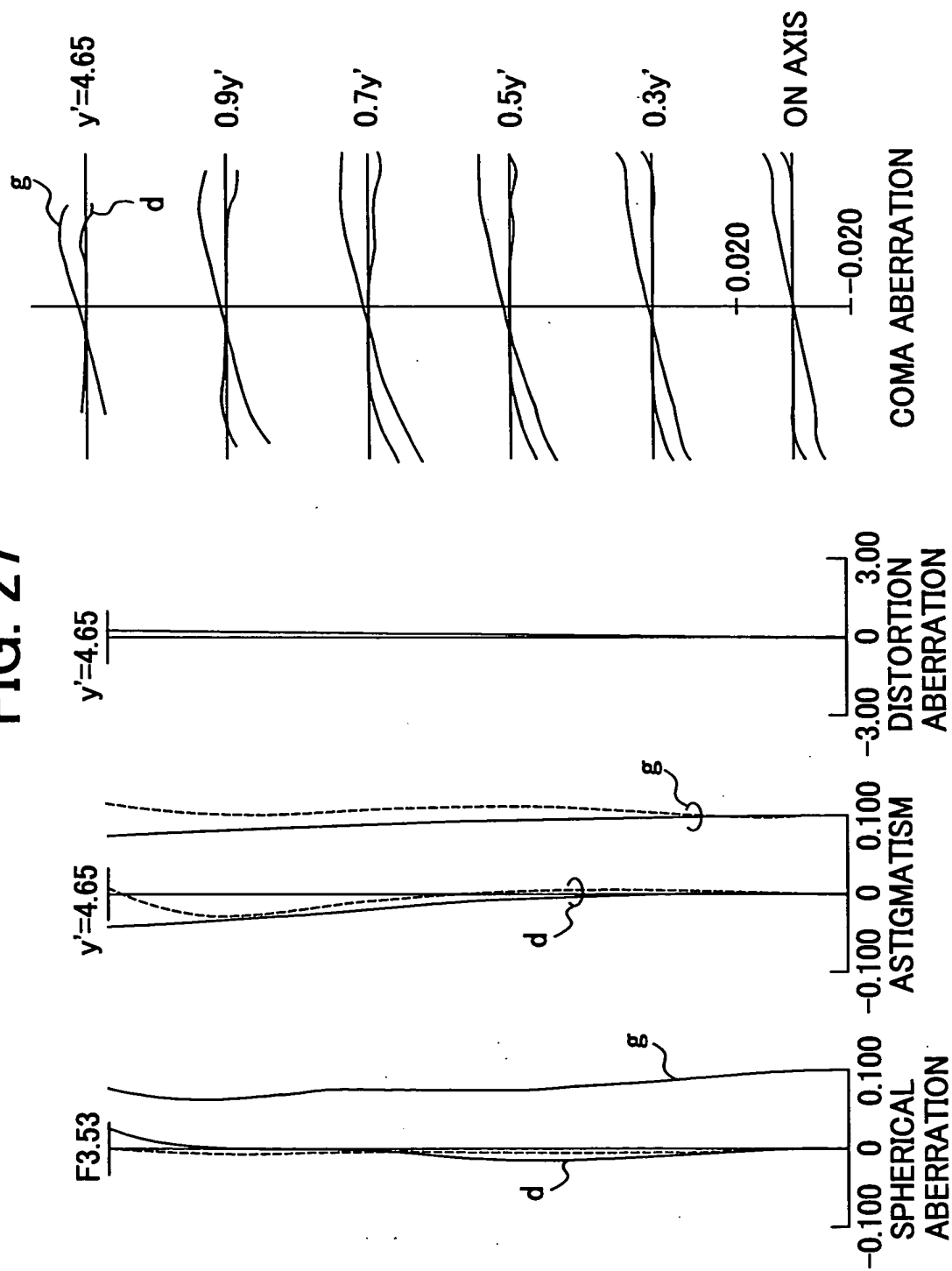


FIG. 28

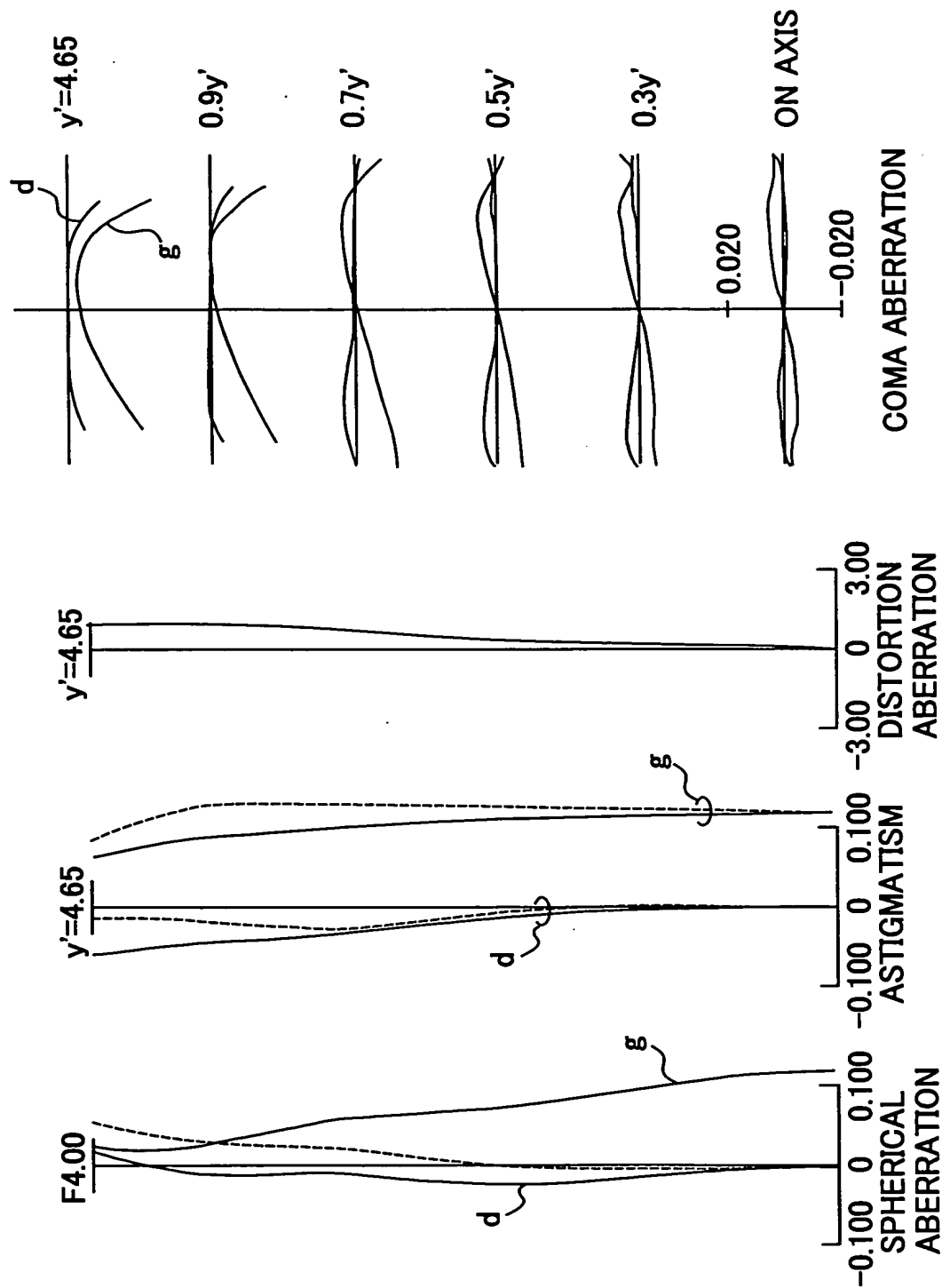


FIG. 29

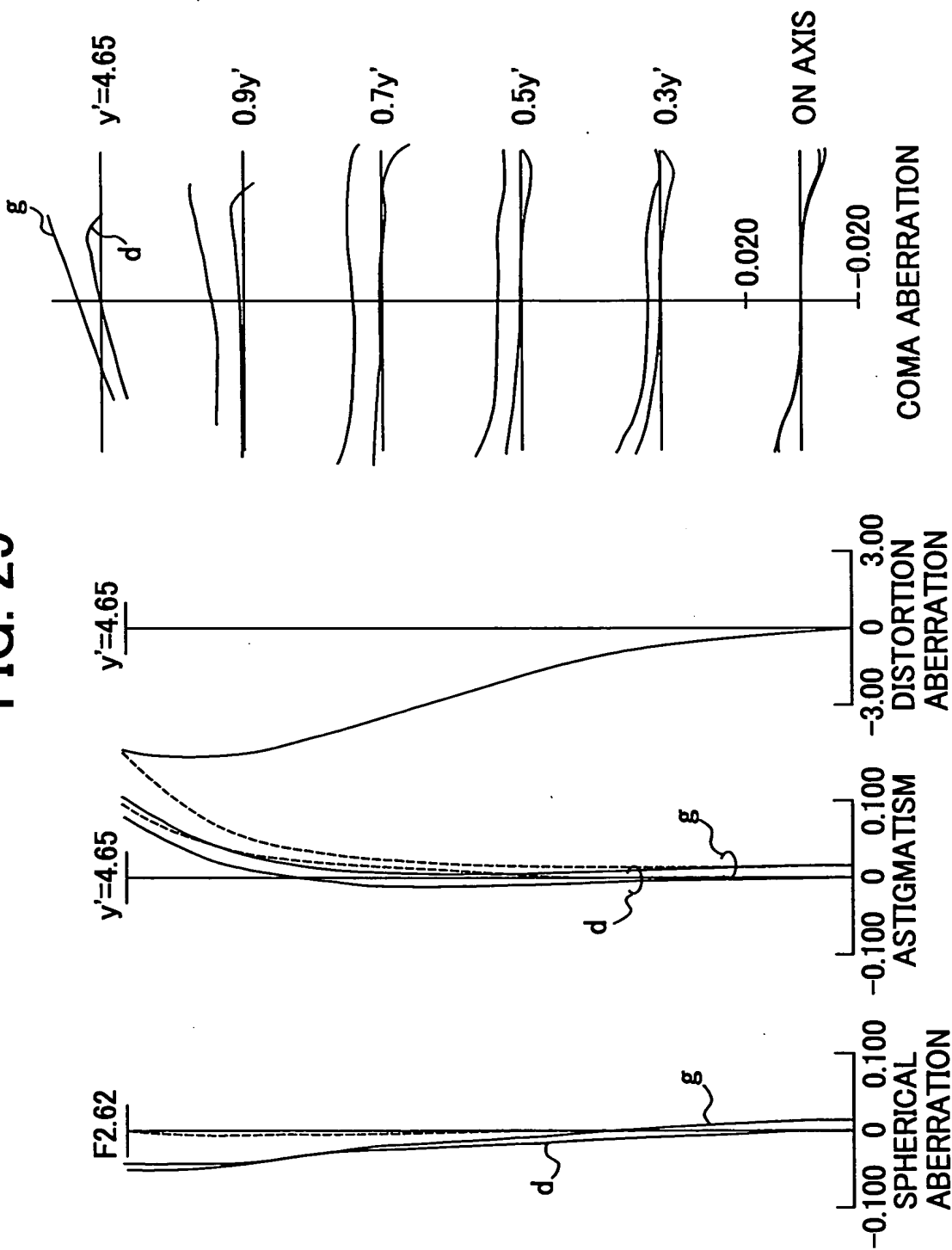


FIG. 30

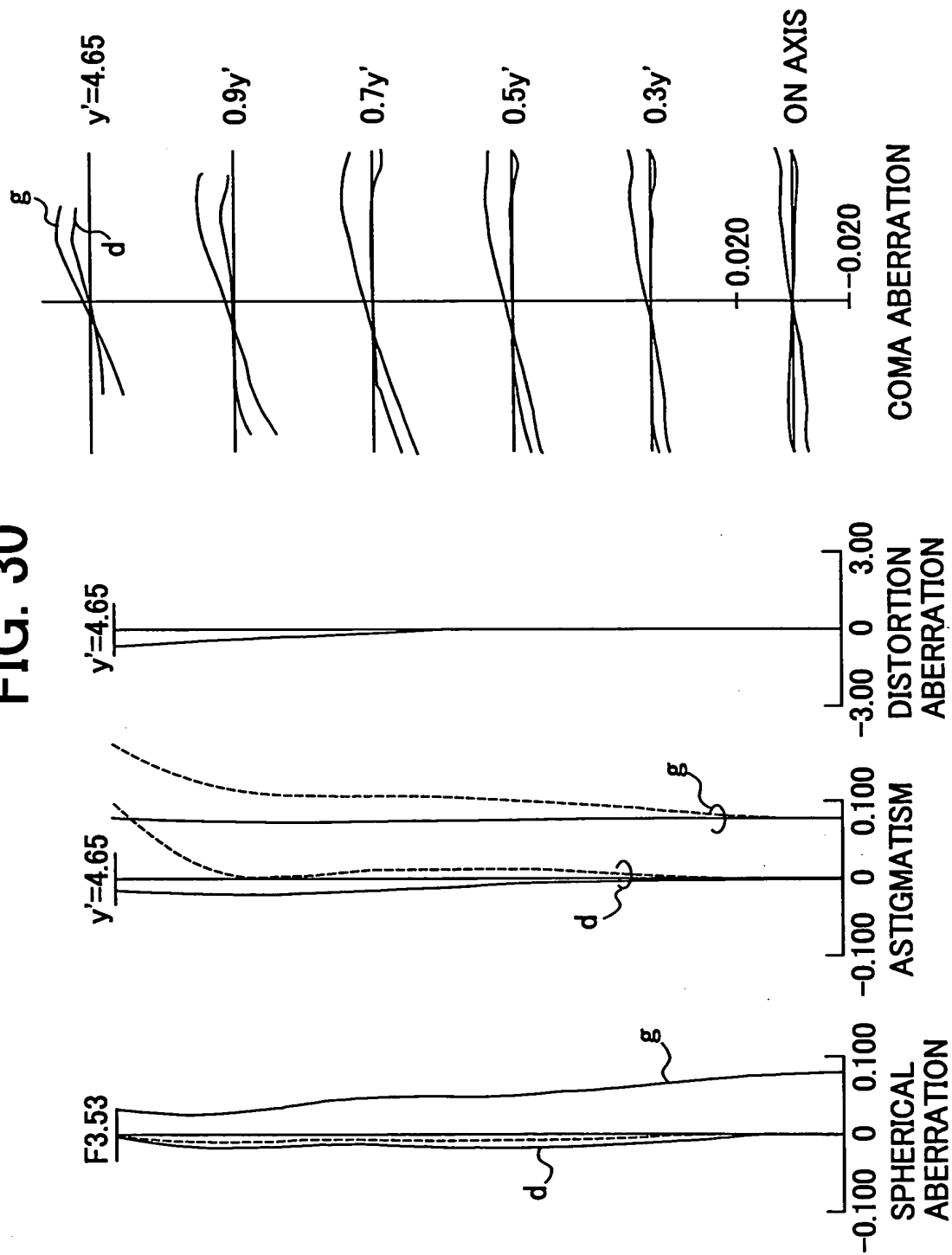


FIG. 31

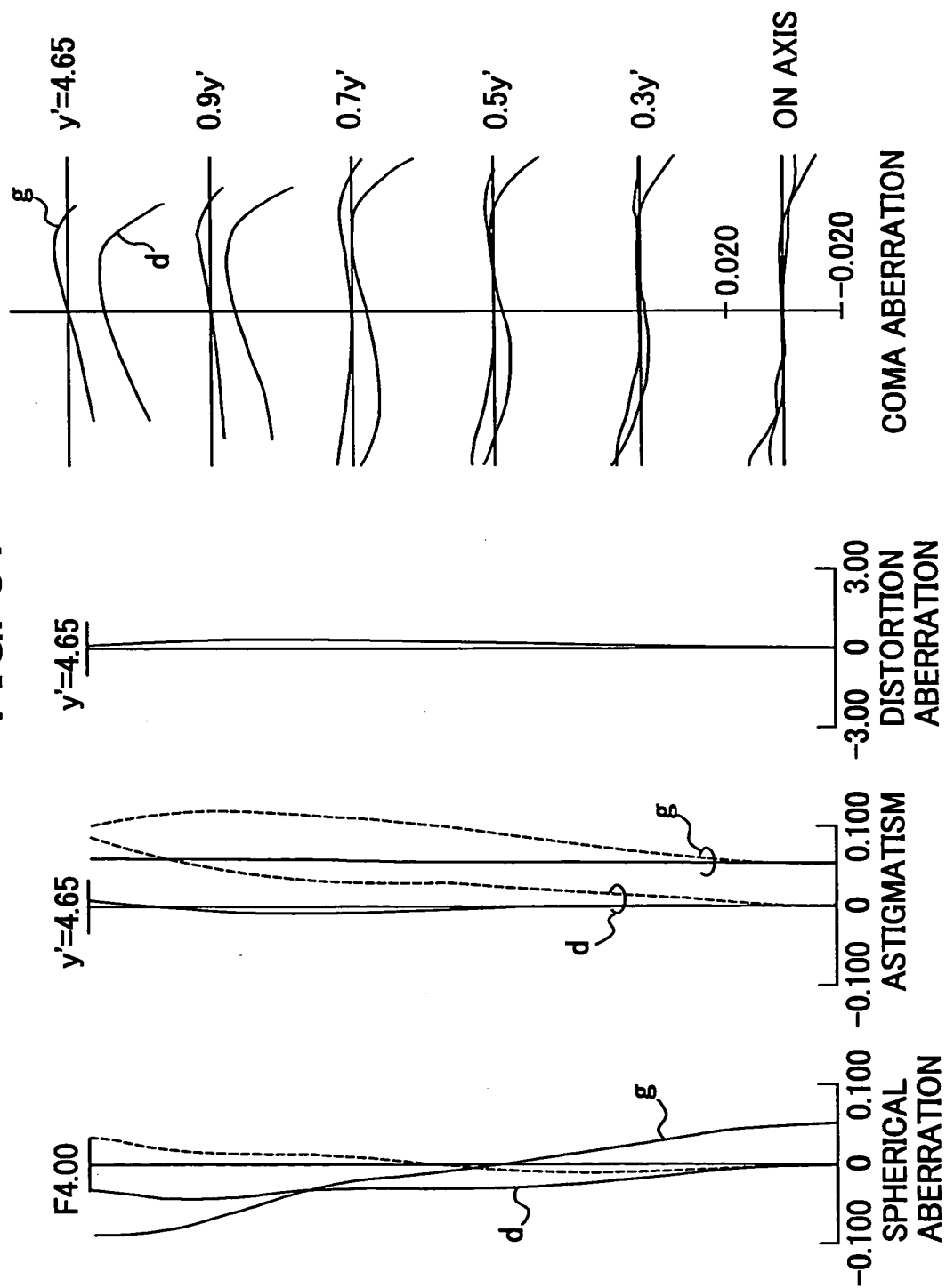


FIG. 32

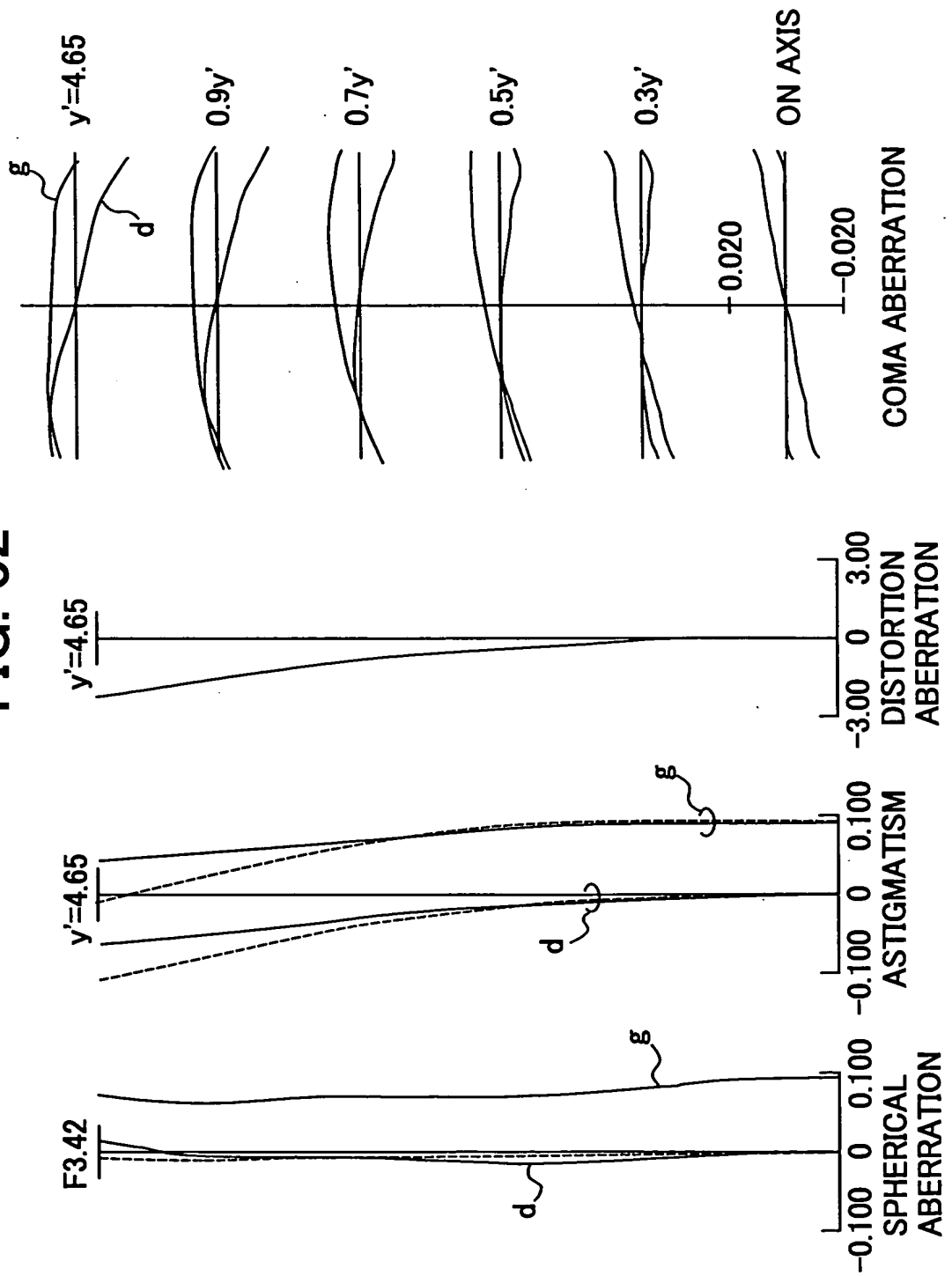


FIG. 33

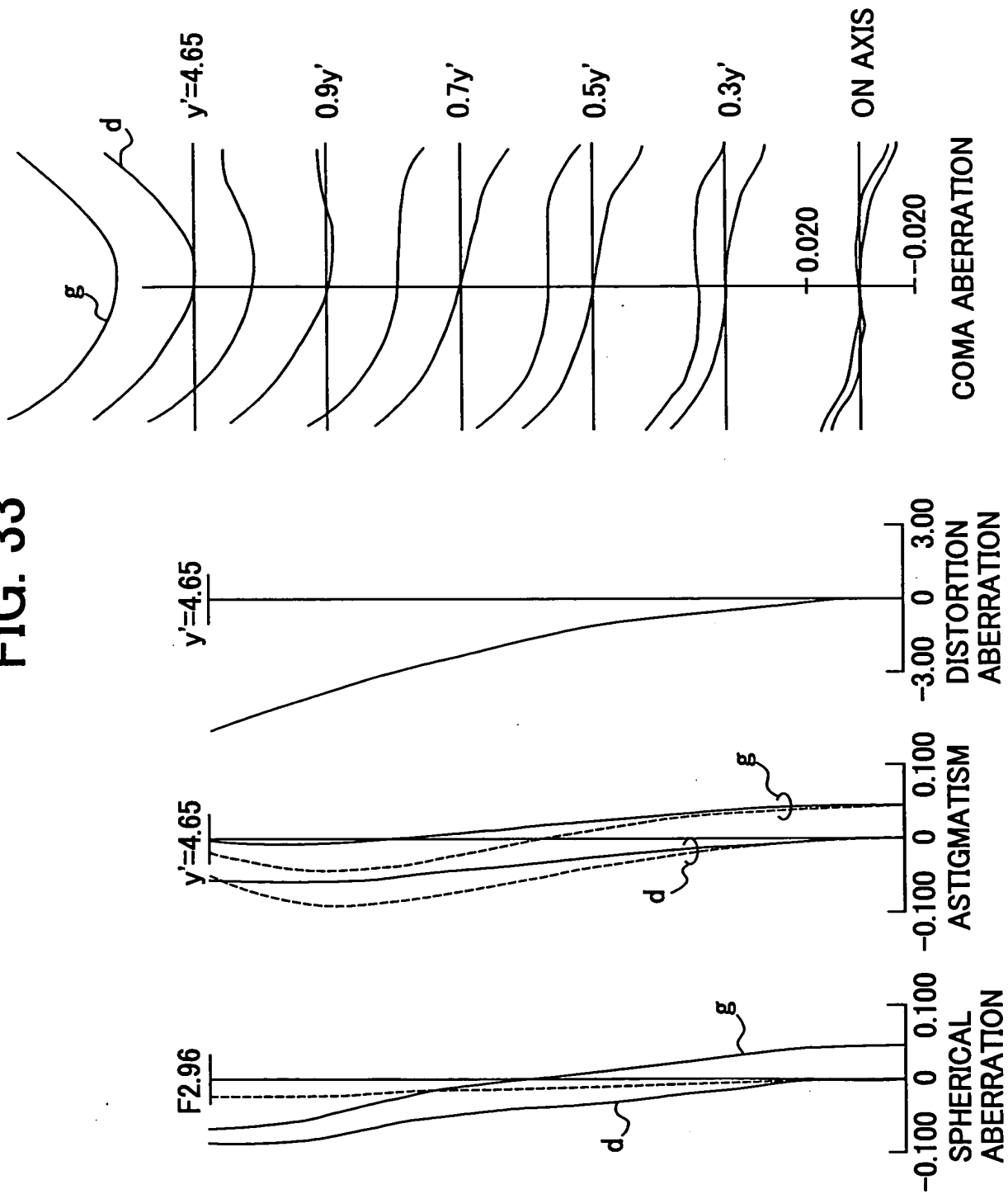


FIG. 34

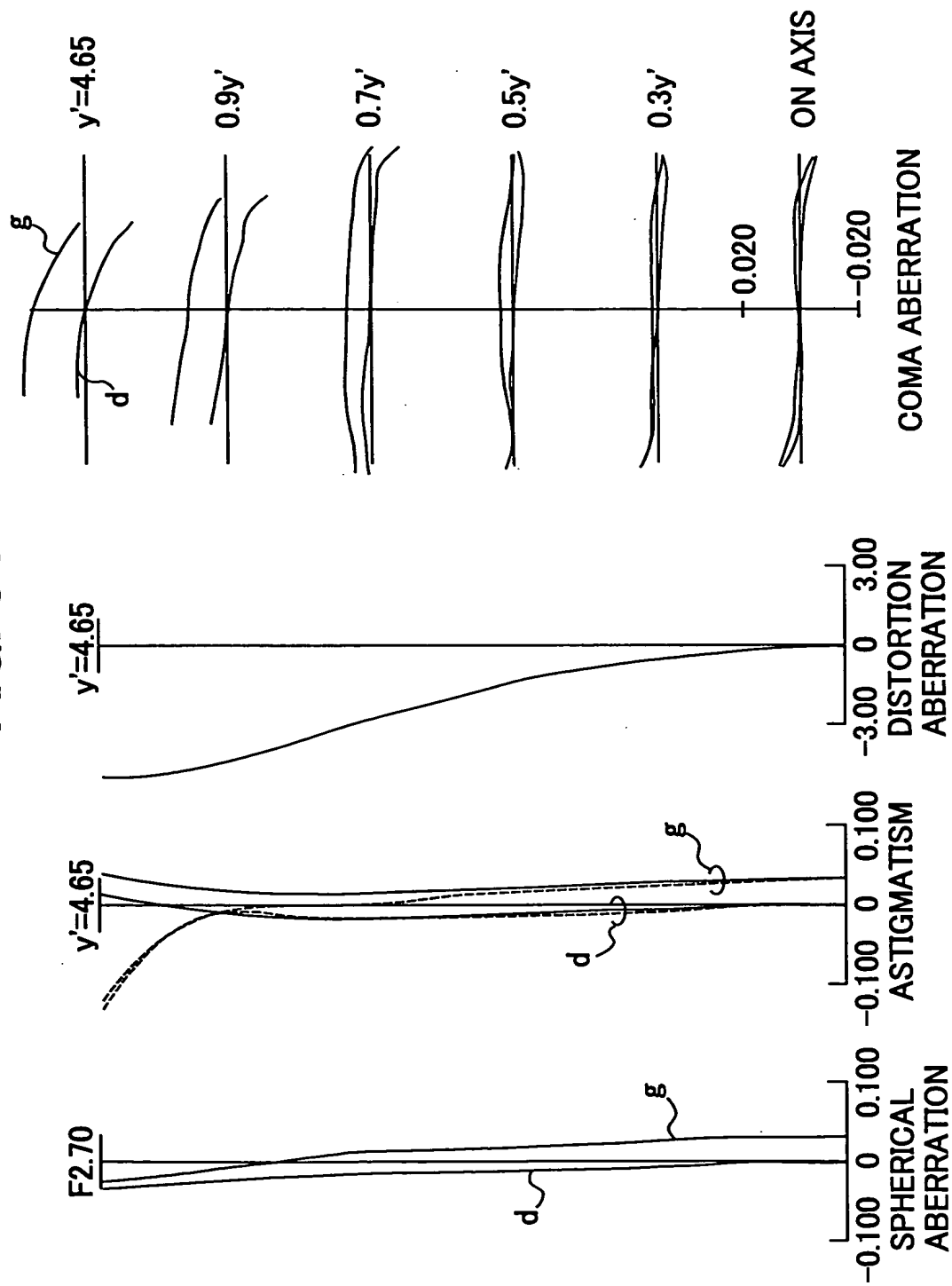




FIG. 35

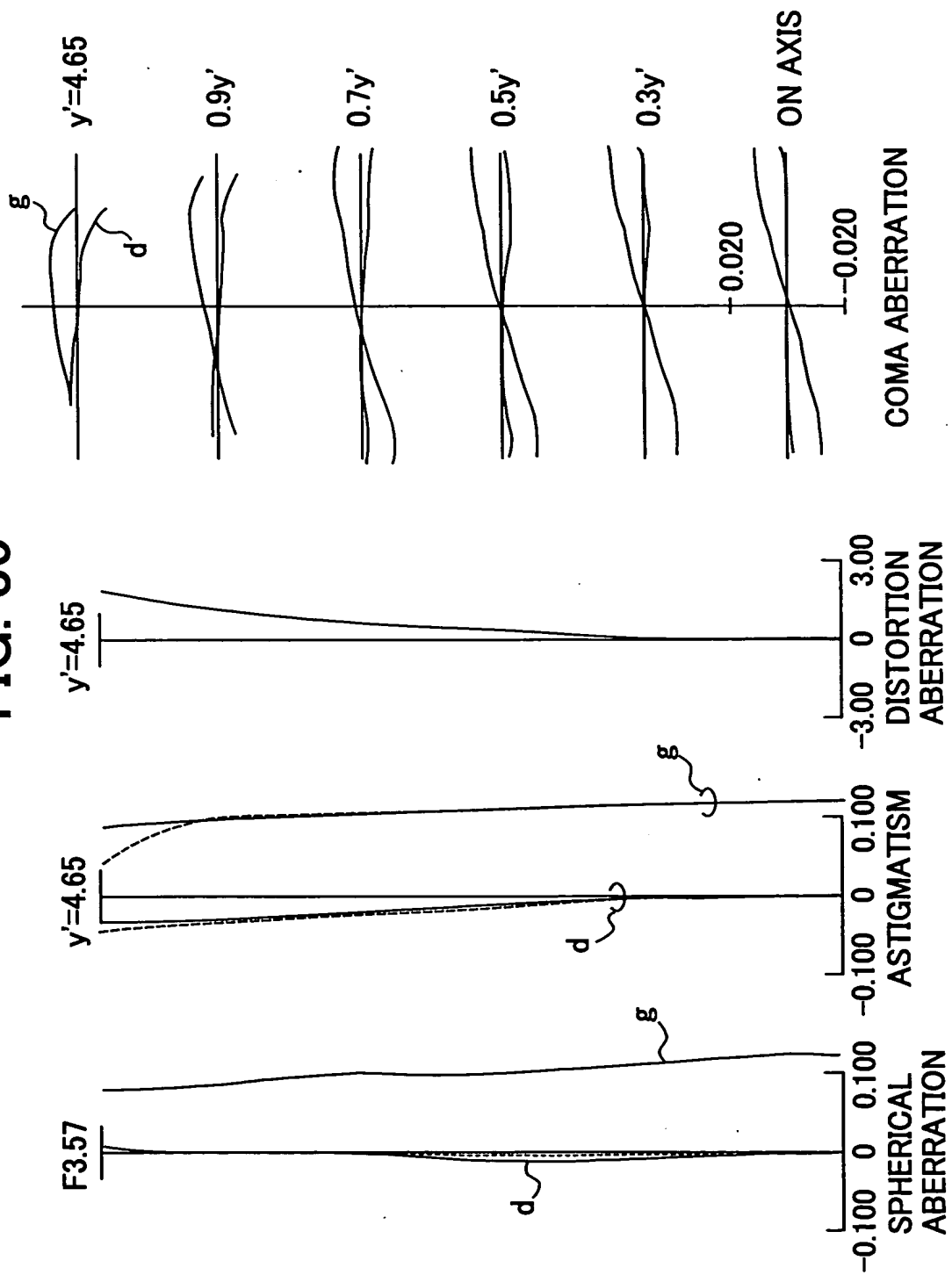


FIG. 36

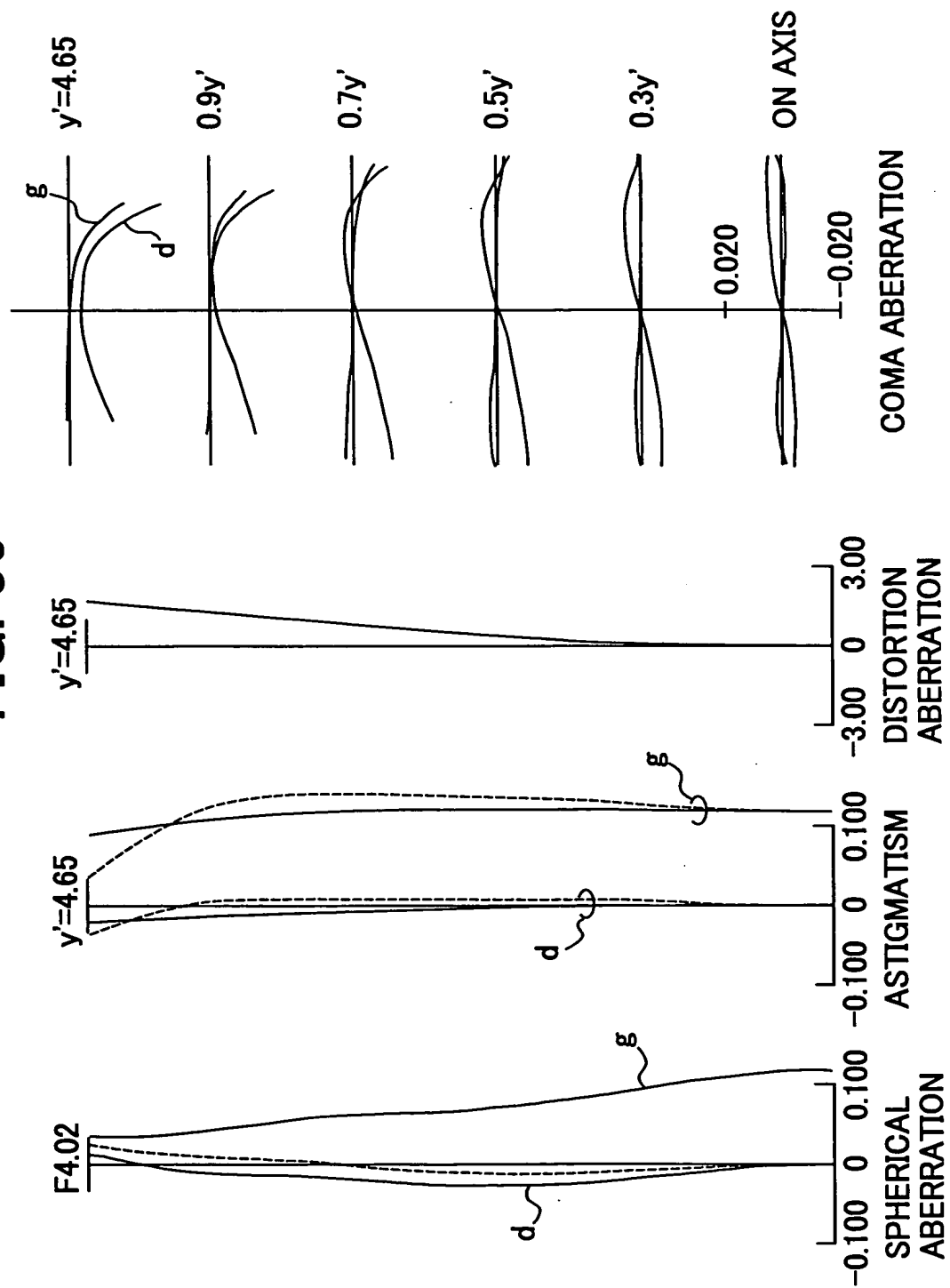


FIG. 37

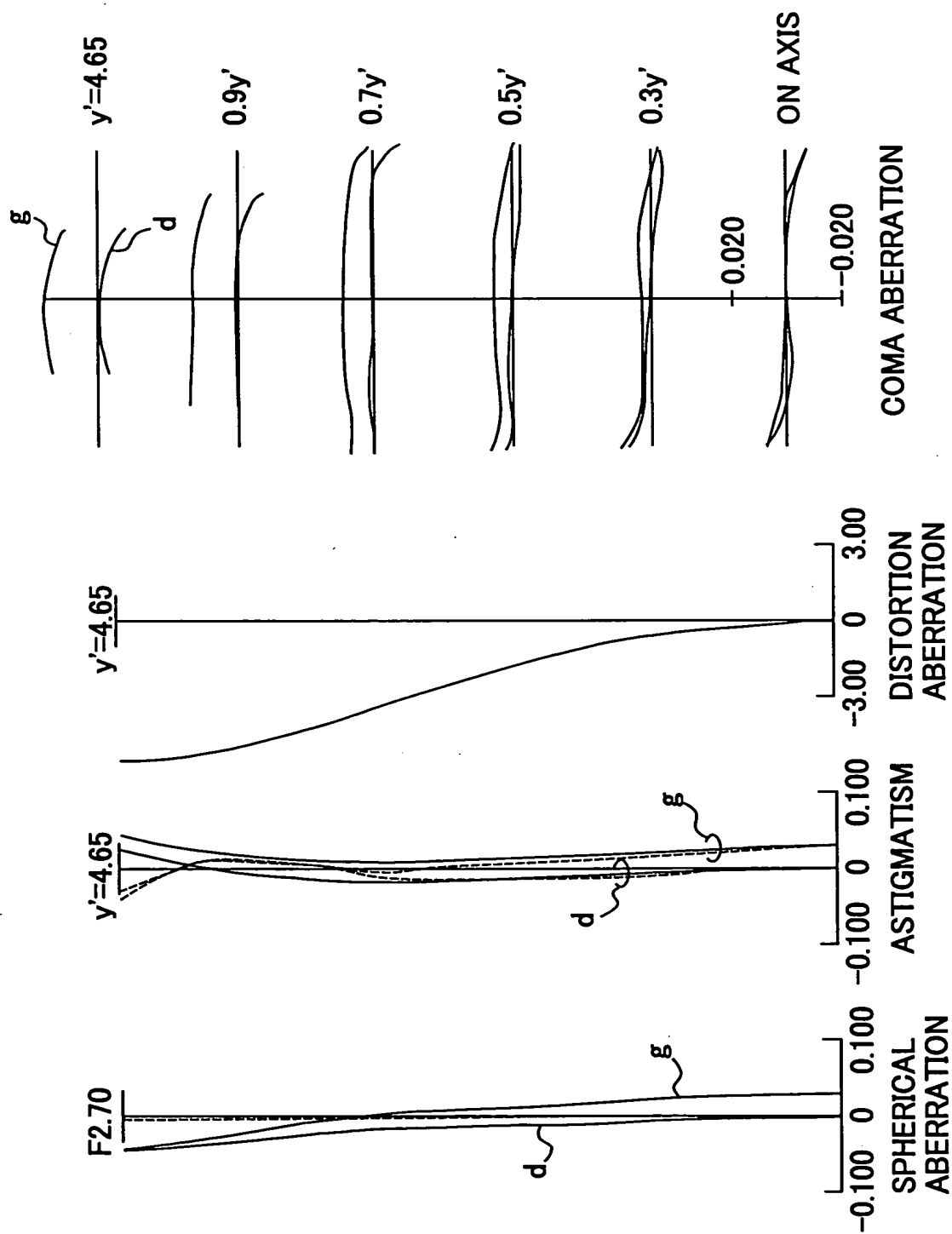


FIG. 38

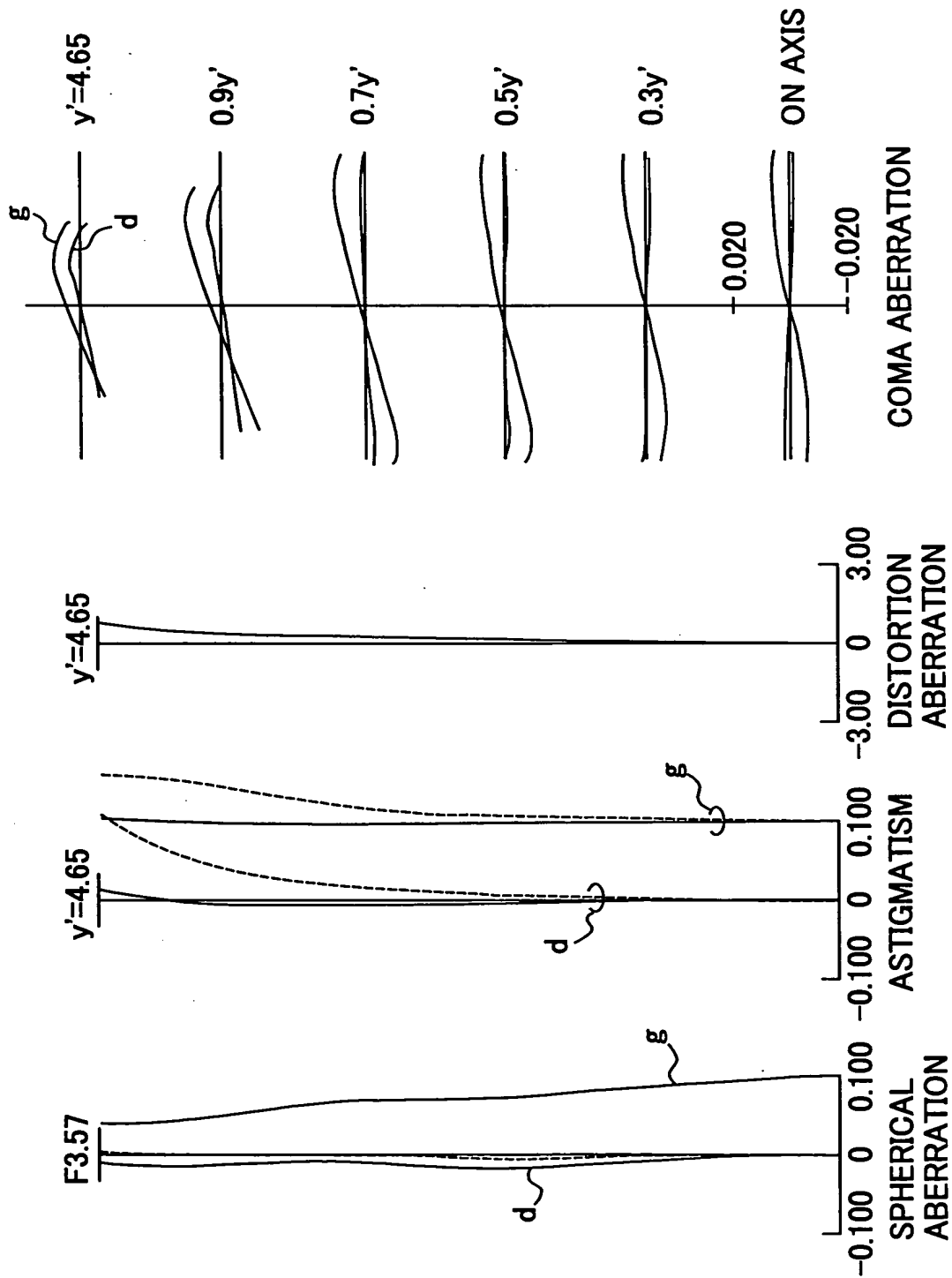


FIG. 39

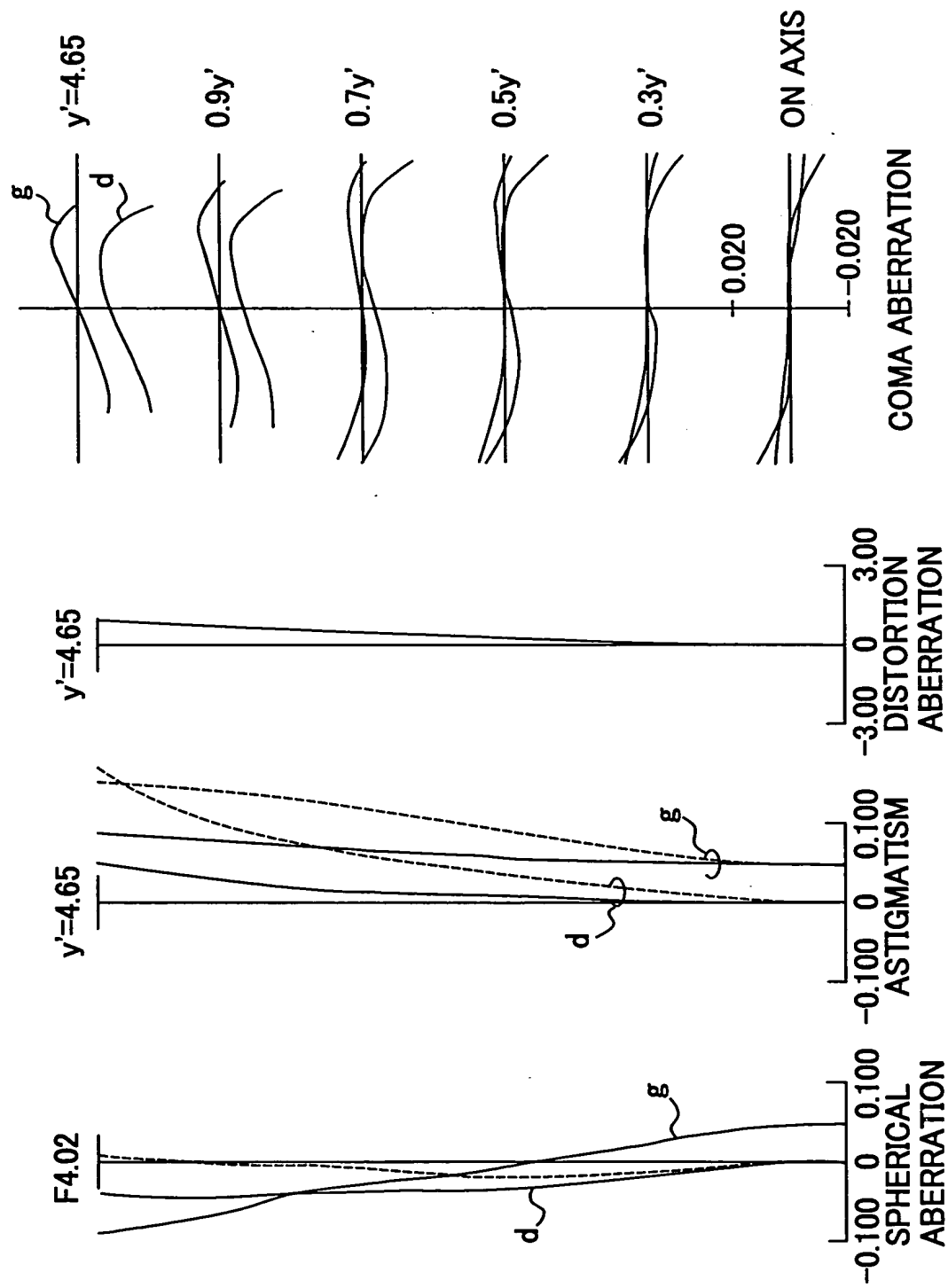


FIG. 40

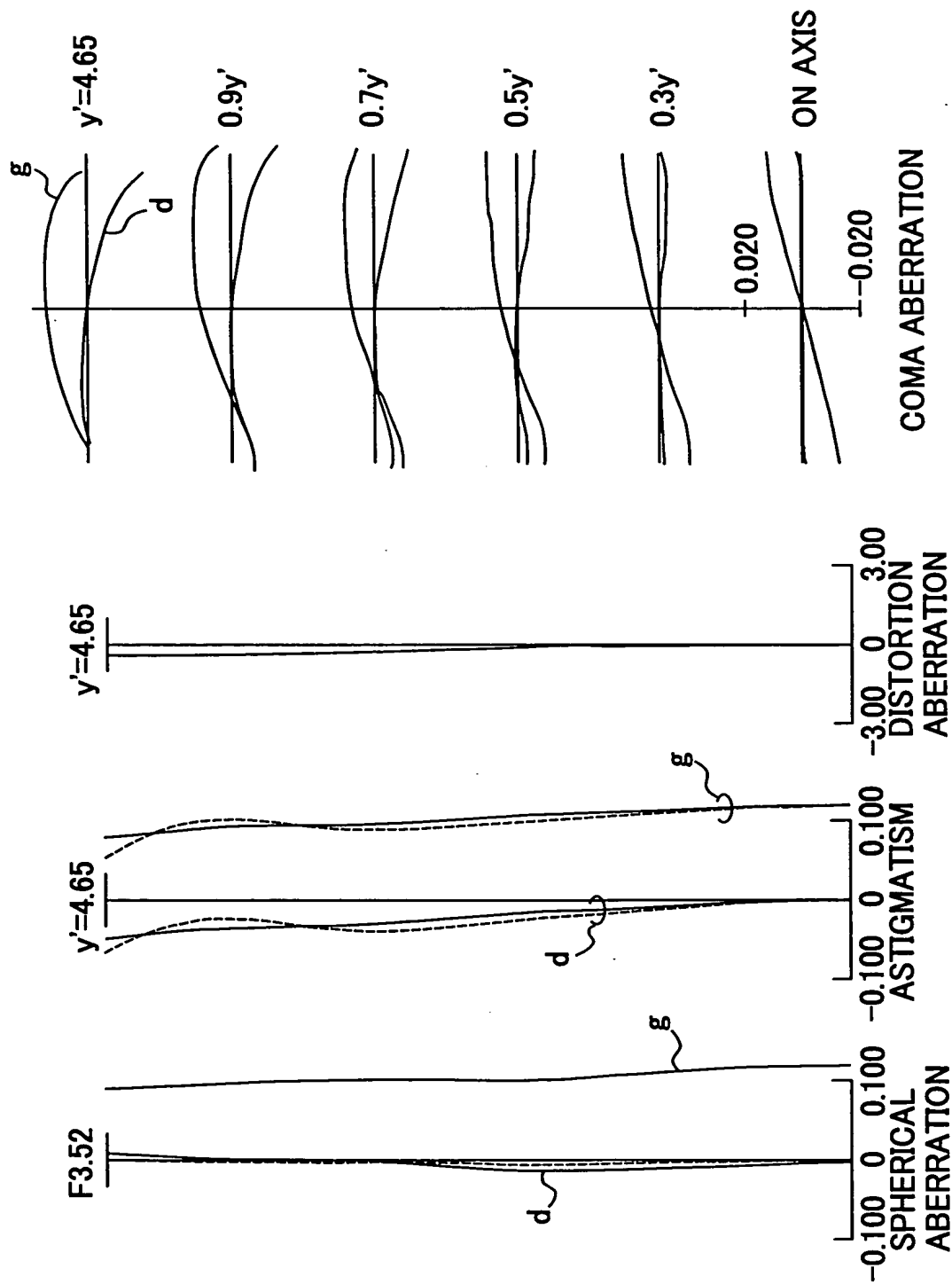


FIG. 41

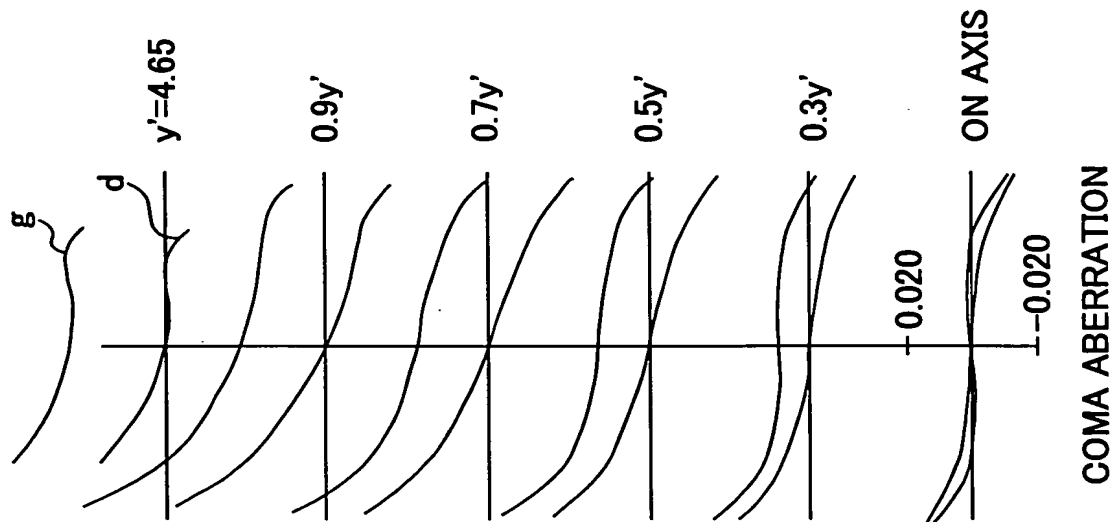
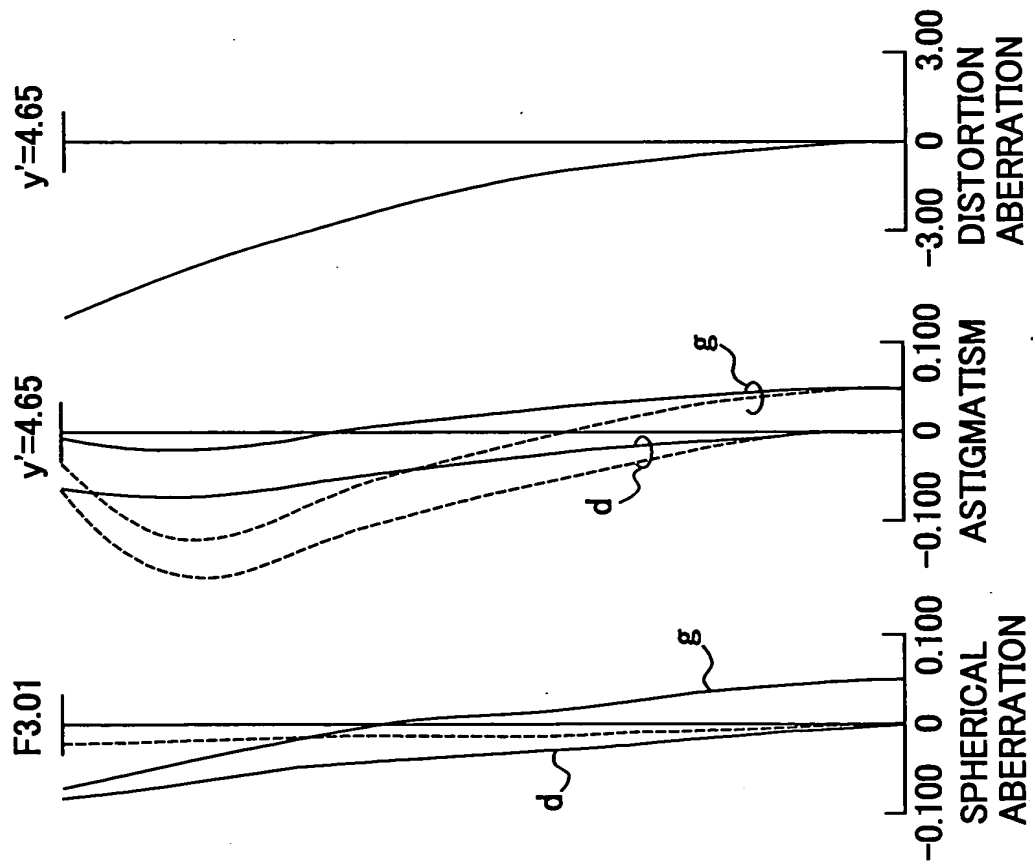


FIG. 42

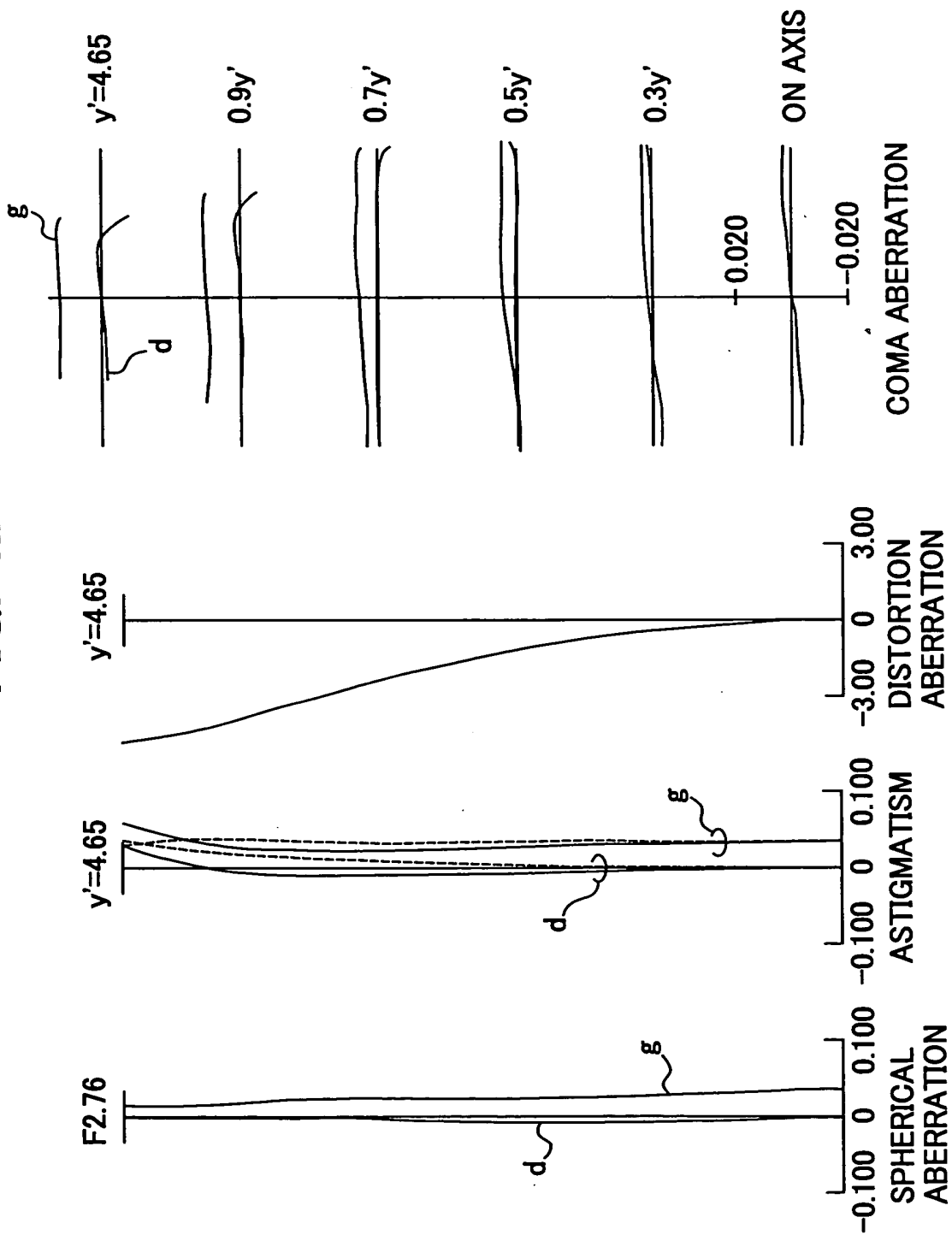




FIG. 43

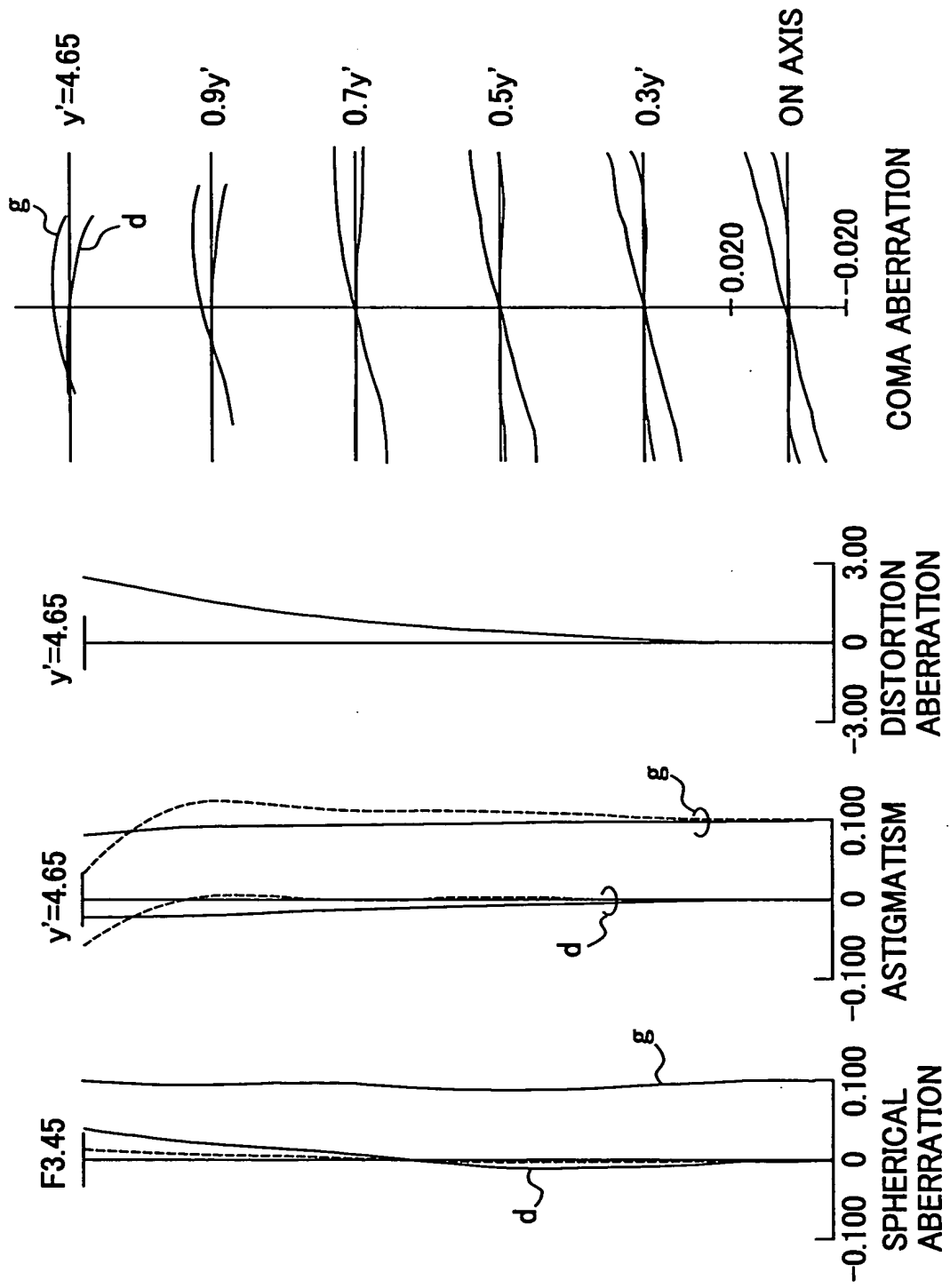


FIG. 44

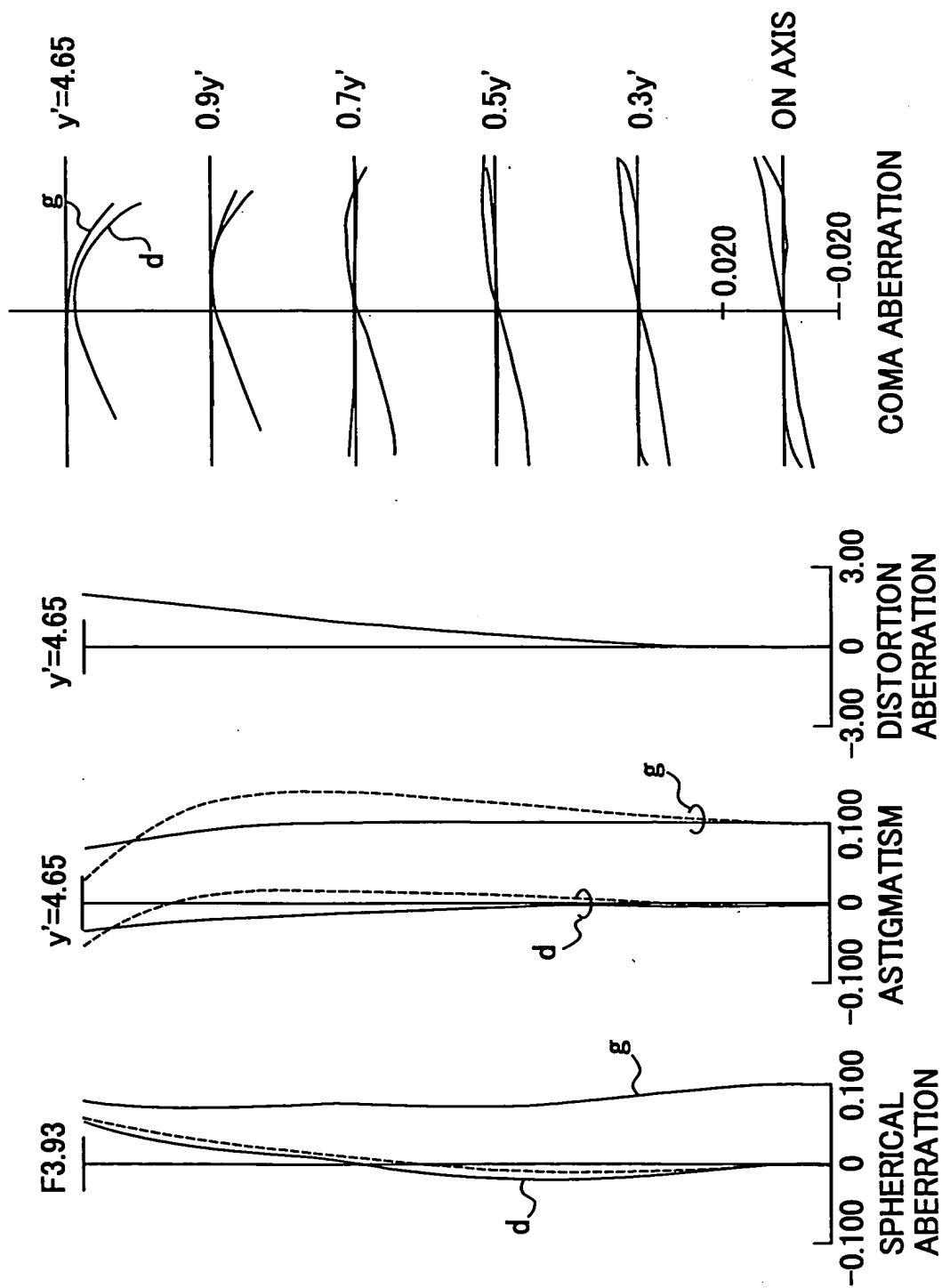


FIG. 45

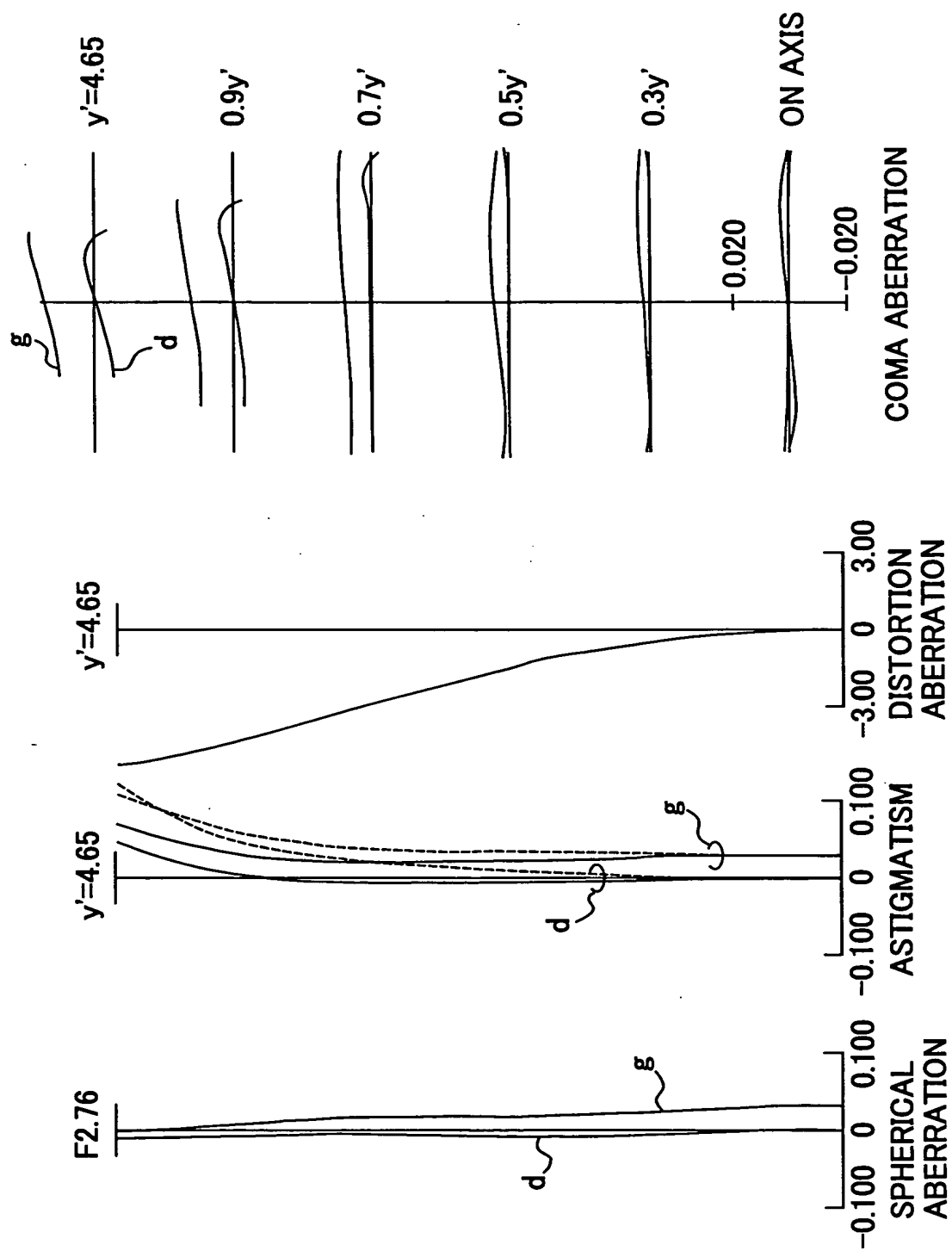


FIG. 46

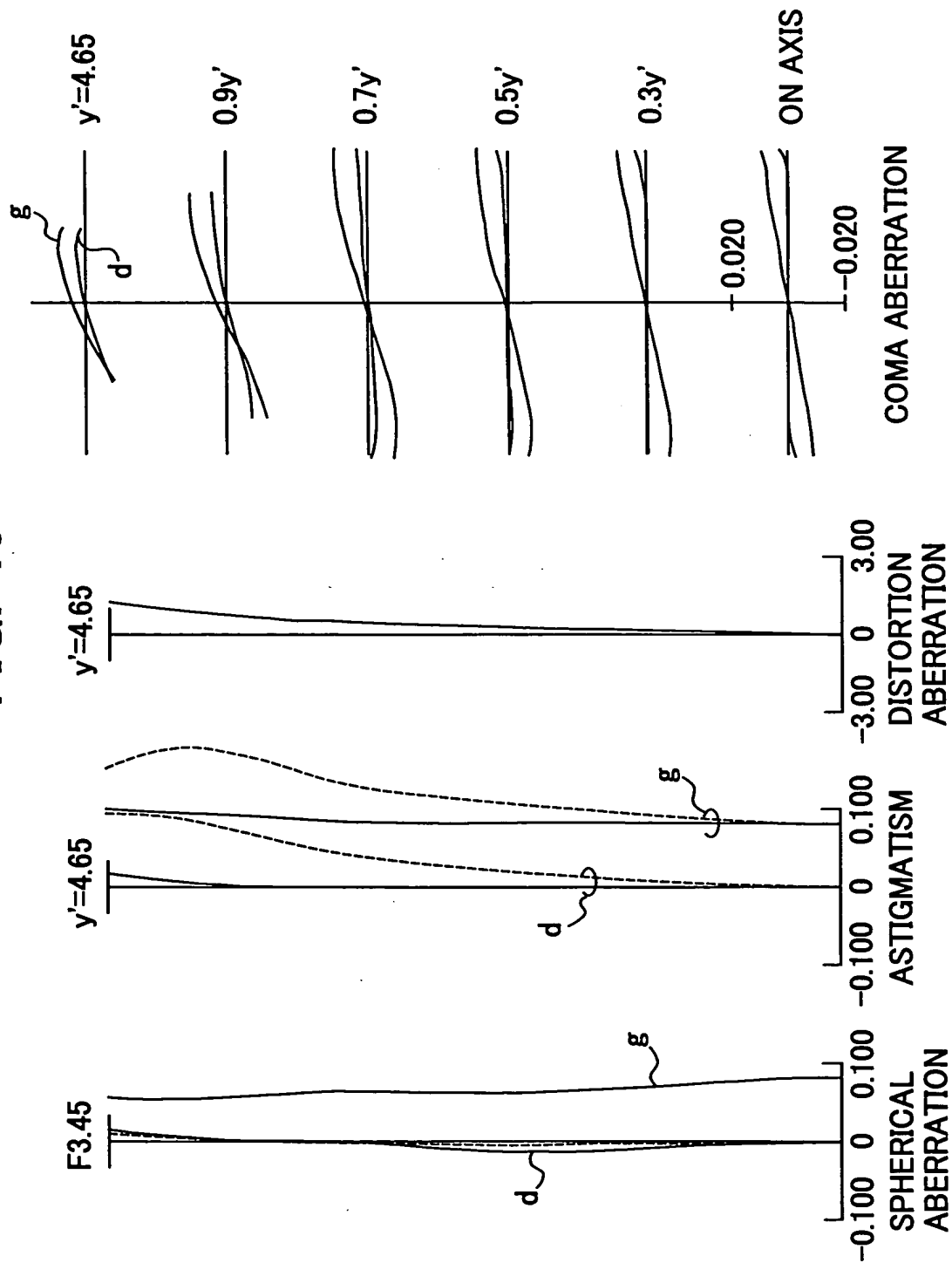


FIG. 47

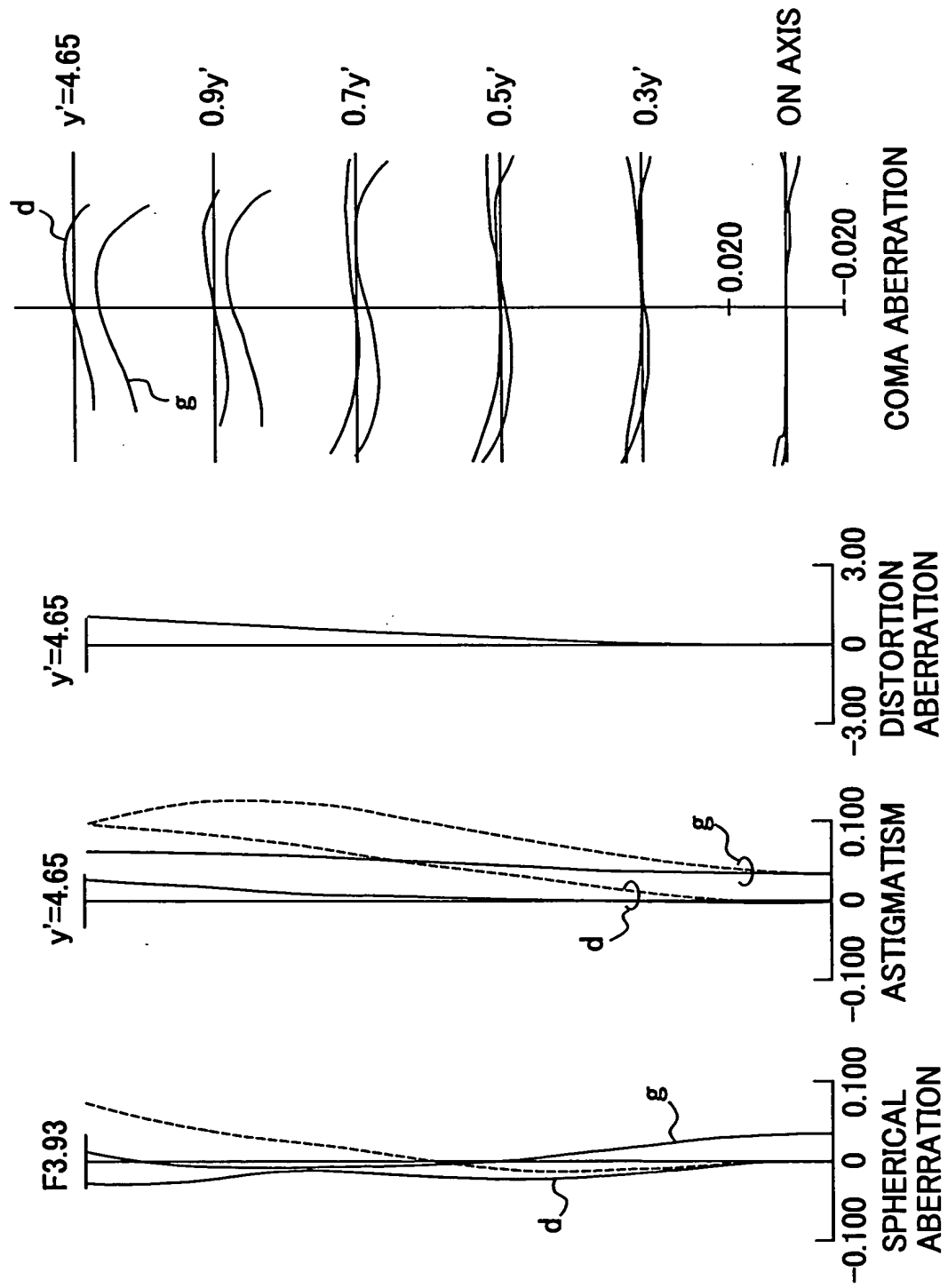


FIG. 48

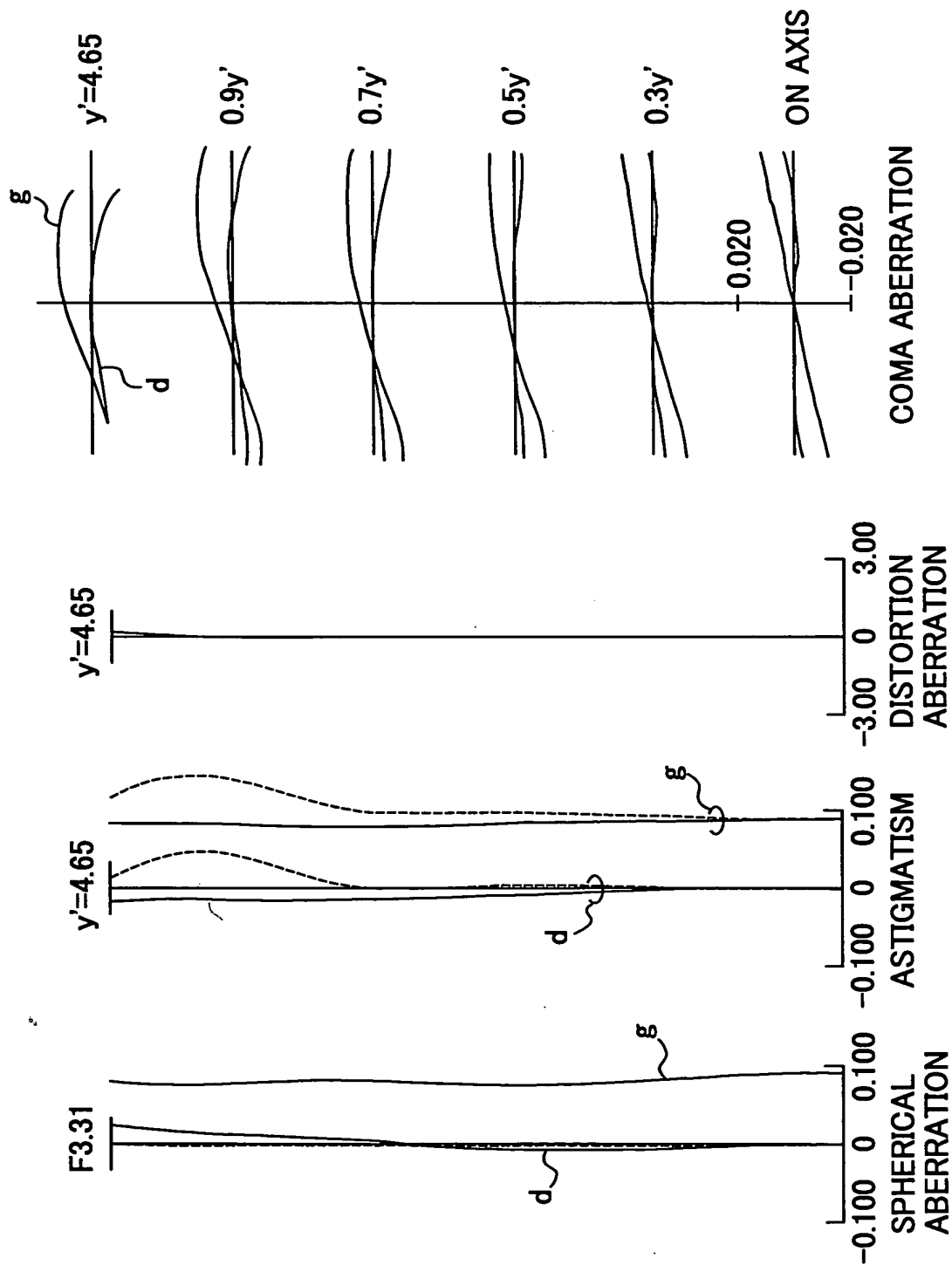
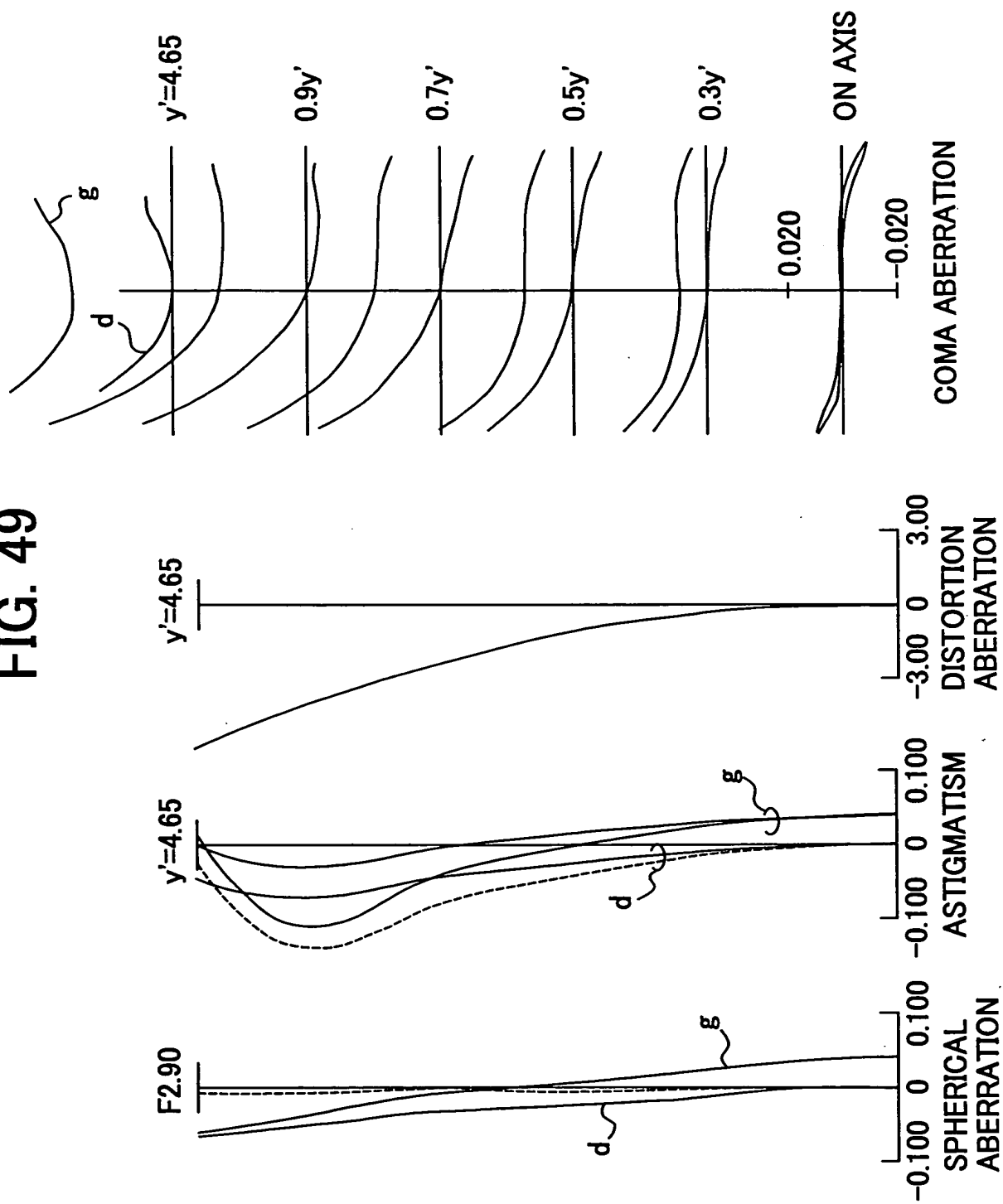


FIG. 49



# FIG. 50A

TABLE 1A

$f=7.52 \sim 35.41$ ,  $F=2.78 \sim 4.02$ ,  $\omega=32.88 \sim 7.35$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	26.655	1.20	1.84666	23.78	1st LENS
02	15.449	0.86			
03	16.227	4.67	1.77250	49.62	2nd LENS
04	-690.022	▲A			
05*	-40.171	1.00	1.77250	49.62	3rd LENS
06	11.901	2.28			
07*	-90.809	0.80	1.77250	49.62	4th LENS
08	11.495	0.10			
09	11.044	2.13	1.84666	23.78	5th LENS
10	62.549	▲B			
11	DIAPHRAGM	0.50			
12*	9.691	1.20	1.48749	70.44	6th LENS
13	16.569	▲C			
14*	16.186	2.04	1.62299	58.12	7th LENS
15	-21.031	0.10			
16	12.470	1.84	1.71300	53.94	8th LENS
17	-582.751	4.37	1.80518	25.46	9th LENS
18	6.332	▲D			
19*	12.416	2.11	1.58913	61.25	10th LENS
20	181.185	OPTION			
21	$\infty$	3.332	1.51680	64.20	VARIETY OF FILTERS
22	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)



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**TABLE 1B**

<p>NON-SPHERICAL SURFACE OF 5th SURFACE</p> <p><math>K=0.0</math>, <math>A_4=5.33251 \times 10^{-5}</math>, <math>A_6=1.60356 \times 10^{-6}</math>, <math>A_8=-1.65292 \times 10^{-8}</math></p> <p><math>A_{10}=9.523698 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE</p> <p><math>K=-5.00470</math>, <math>A_4=-2.37368 \times 10^{-5}</math>, <math>A_6=-2.56706 \times 10^{-6}</math>, <math>A_8=-2.81710 \times 10^{-8}</math></p> <p><math>A_{10}=1.37805 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE</p> <p><math>K=-1.96407</math>, <math>A_4=1.55199 \times 10^{-4}</math>, <math>A_6=-6.14819 \times 10^{-6}</math>, <math>A_8=5.61905 \times 10^{-7}</math></p> <p><math>A_{10}=-2.19665 \times 10^{-8}</math></p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE</p> <p><math>K=-2.41495</math>, <math>A_4=-6.33751 \times 10^{-5}</math>, <math>A_6=1.38599 \times 10^{-6}</math>, <math>A_8=-8.42773 \times 10^{-8}</math></p> <p><math>A_{10}=1.83313 \times 10^{-4}</math></p>
<p>NON-SPHERICAL SURFACE OF 19th SURFACE</p> <p><math>K=0.0</math>, <math>A_4=3.25504 \times 10^{-5}</math>, <math>A_6=-1.10948 \times 10^{-6}</math>, <math>A_8=9.67180 \times 10^{-8}</math></p> <p><math>A_{10}=-1.28197 \times 10^{-9}</math></p>

**TABLE 1C**  
**VARIABLE INTERVAL**

	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.32	LONG FOCAL POINT END f=35.41
A	1.000	8.525	14.979
B	15.595	8.070	1.616
C	8.078	4.388	1.500
D	3.854	7.544	10.432

**TABLE 1D**  
**PARAMETER VALUE OF**  
**CONDITIONAL EXPRESSION**

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.47$
$(f_{12T}/f_1)=-1.090$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.537$

**TABLE 1E**  
**FOCAL LENGTH & VARIABLE INTERVALS WHEN MAGNIFICATION**  
**FROM SHORT TO LONG FOCAL POINT ENDS IS PERFORMED AND**  
**THE 4TH LENS BAND IS CLOSEST TO THE 3RD LENS BAND**

f:32.861,	A:14.155,	B:2.440,	C:1.350,	D:10.582
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# FIG. 51A

TABLE 2A

$f=7.52\sim35.42$ ,  $F=2.68\sim4.02$ ,  $\omega=32.96\sim7.32$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	26.120	1.20	1.84666	23.78	1st LENS
02	15.408	0.73			
03	16.082	4.44	1.77250	49.62	2nd LENS
04	-2461.477	▲A			
05*	-53.574	1.00	1.80610	40.73	3rd LENS
06	11.021	2.33			
07*	-189.253	0.80	1.69350	53.34	4th LENS
08	9.727	0.11			
09	9.808	2.22	1.84666	23.78	5th LENS
10	43.589	▲B			
11	DIAPHRAGM	0.50			
12*	10.080	1.19	1.48749	70.44	6th LENS
13	17.824	▲C			
14*	14.261	2.45	1.58913	61.25	7th LENS
15	-21.061	0.10			
16	11.627	2.45	1.70514	41.15	8th LENS
17	-33.441	2.88	1.80518	25.46	9th LENS
18	6.497	▲D			
19*	10.344	1.98	1.58913	61.25	10th LENS
20	33.975	OPTION			
21	$\infty$	3.332	1.51680	64.20	VARIETY OF FILTERS
22	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)

# FIG. 51B

TABLE 2B

<p>NON-SPHERICAL SURFACE OF 5th SURFACE  <math>K=0.0</math>, <math>A_4=3.77213 \times 10^{-5}</math>, <math>A_6=1.03690 \times 10^{-6}</math>, <math>A_8=1.11273 \times 10^{-8}</math>  <math>A_{10}=6.33905 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE  <math>K=0.0</math>, <math>A_4=9.35662 \times 10^{-6}</math>, <math>A_6=-2.41906 \times 10^{-6}</math>, <math>A_8=5.93970 \times 10^{-9}</math>  <math>A_{10}=-3.64847 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE  <math>K=-2.14178</math>, <math>A_4=1.44251 \times 10^{-4}</math>, <math>A_6=-4.77086 \times 10^{-6}</math>, <math>A_8=4.23771 \times 10^{-7}</math>  <math>A_{10}=-1.74996 \times 10^{-8}</math></p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE  <math>K=-1.75847</math>, <math>A_4=-4.69337 \times 10^{-5}</math>, <math>A_6=5.28273 \times 10^{-7}</math>, <math>A_8=-2.09994 \times 10^{-8}</math>  <math>A_{10}=3.06349 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 19th SURFACE  <math>K=0.0</math>, <math>A_4=-3.92832 \times 10^{-5}</math>, <math>A_6=-4.61773 \times 10^{-7}</math>, <math>A_8=8.17517 \times 10^{-6}</math>  <math>A_{10}=-1.25985 \times 10^{-9}</math></p>

TABLE 2C  
VARIABLE INTERVAL

	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$
A	1.000	8.620	14.603
B	15.257	7.636	1.654
C	8.946	5.131	1.500
D	3.196	7.057	11.587

TABLE 2D  
PARAMETER VALUE OF  
CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.55$
$(f_{12T}/f_1)=-1.086$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.523$

TABLE 2B

# FIG. 52A

TABLE 3A

$f=7.52 \sim 42.48$ ,  $F=2.38 \sim 4.00$ ,  $\omega=33.10 \sim 6.12$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	31.036	1.02	1.84666	23.78	1st LENS
02	17.869	1.41			
03	19.260	4.17	1.77250	49.62	2nd LENS
04	-267.057	▲A			
05*	-43.607	1.00	1.83500	42.98	3rd LENS
06	11.134	2.45			
07*	-378.543	0.80	1.74330	49.22	4th LENS
08	14.455	0.10			
09	13.436	2.30	1.84666	23.78	5th LENS
10	339.694	▲B			
11	DIAPHRAGM	0.50			
12*	11.208	1.21	1.48749	70.44	6th LENS
13	17.548	▲C			
14*	16.335	2.80	1.62299	58.12	7th LENS
15	-30.357	0.10			
16	16.543	3.24	1.77250	49.62	8th LENS
17	-17.522	2.43	1.71736	29.50	9th LENS
18	7.459	▲D			
19*	9.682	2.25	1.48749	70.44	10th LENS
20	30.238	OPTION			
21	$\infty$	3.332	1.51680	64.20	VARIETY OF FILTERS
22	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)

TABLE 3A

## 095632-3 1007

### TABLE 3B

<p>NON-SPHERICAL SURFACE OF 5th SURFACE</p> <p><math>K=0.0</math>, <math>A_4=5.12563 \times 10^{-5}</math>, <math>A_6=1.60220 \times 10^{-7}</math>, <math>A_8=6.03181 \times 10^{-11}</math></p> <p><math>A_{10}=-5.54096 \times 10^{-12}</math></p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE</p> <p><math>K=-2372.29</math>, <math>A_4=8.29144 \times 10^{-6}</math>, <math>A_6=-3.62960 \times 10^{-7}</math>, <math>A_8=-1.18221 \times 10^{-8}</math></p> <p><math>A_{10}=-6.64935 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE</p> <p><math>K=-2.54795</math>, <math>A_4=1.30168 \times 10^{-4}</math>, <math>A_6=-9.63887 \times 10^{-7}</math>, <math>A_8=7.57566 \times 10^{-9}</math></p> <p><math>A_{10}=-2.29717 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE</p> <p><math>K=-1.25642</math>, <math>A_4=-4.03456 \times 10^{-5}</math>, <math>A_6=4.01824 \times 10^{-8}</math>, <math>A_8=-1.74724 \times 10^{-9}</math></p> <p><math>A_{10}=1.17398 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 19th SURFACE</p> <p><math>K=0.0</math>, <math>A_4=-4.24707 \times 10^{-5}</math>, <math>A_6=5.03298 \times 10^{-7}</math>, <math>A_8=2.74980 \times 10^{-9}</math></p> <p><math>A_{10}=3.15192 \times 10^{-11}</math></p>

**TABLE 3C**  
**VARIABLE INTERVAL**

	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=17.88	LONG FOCAL POINT END f=42.48
A	1.000	10.341	17.787
B	18.311	8.970	1.524
C	12.515	6.527	1.500
D	3.171	10.194	16.950

**TABLE 3D**  
**PARAMETER VALUE OF**  
**CONDITIONAL EXPRESSION**

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.66$
$(f_{12T}/f_1)=-1.144$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.465$

# FIG. 53A

TABLE 4A

$f=7.52 \sim 35.42$ ,  $F=2.62 \sim 4.00$ ,  $\omega=32.99 \sim 7.41$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	26.529	1.20	1.84666	23.78	1st LENS
02	15.607	1.17			
03	16.702	4.36	1.77250	49.62	2nd LENS
04	-371.916	▲A			
05*	-29.404	1.00	1.80610	40.73	3rd LENS
06	8.571	2.20			
07	32.023	0.80	1.54072	47.20	4th LENS
08	8.557	2.49	1.84666	23.78	5th LENS
09	30.960	▲B			
10	DIAPHRAGM	0.50			
11*	7.674	1.10	1.58913	61.25	6th LENS
12	8.158	▲C			
13*	10.021	2.54	1.58913	61.25	7th LENS
14*	-63.691	0.10			
15	15.867	2.15	1.48749	70.44	8th LENS
16	-50.882	0.10			
17	12.522	1.82	1.59913	61.25	9th LENS
18	76.837	0.80	1.80518	25.46	10th LENS
19	5.641	▲D			
20	18.992	3.37	1.60342	38.01	11th LENS
21*	-47.165	OPTION			
22	$\infty$	3.214	1.51680	64.20	VARIETY OF FILTERS
23	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)

**000000000000**

TABLE 4B

<p>NON-SPHERICAL SURFACE OF 5th SURFACE</p> <p><math>K=0.0</math>, <math>A_4=1.37015 \times 10^{-4}</math> <math>A_6=-9.81958 \times 10^{-7}</math> <math>A_8=9.21207 \times 10^{-9}</math></p> <p><math>A_{10}=-4.92691 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE OF 11th SURFACE</p> <p><math>K=-1.20196</math>, <math>A_4=2.83724 \times 10^{-4}</math> <math>A_6=-6.86713 \times 10^{-6}</math> <math>A_8=9.48847 \times 10^{-7}</math></p> <p><math>A_{10}=-3.87184 \times 10^{-6}</math></p>
<p>NON-SPHERICAL SURFACE OF 13th SURFACE</p> <p><math>K=-1.13642</math>, <math>A_4=6.34825 \times 10^{-6}</math> <math>A_6=2.90033 \times 10^{-6}</math> <math>A_8=-3.90207 \times 10^{-8}</math></p> <p><math>A_{10}=1.09626 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE</p> <p><math>K=-70.9456</math>, <math>A_4=6.79619 \times 10^{-11}</math> <math>A_6=3.00428 \times 10^{-6}</math> <math>A_8=-3.35316 \times 10^{-8}</math></p> <p><math>A_{10}=-1.72607 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 21th SURFACE</p> <p><math>K=14.57109</math>, <math>A_4=-5.21909 \times 10^{-5}</math> <math>A_6=-3.69390 \times 10^{-6}</math> <math>A_8=7.04367 \times 10^{-8}</math></p> <p><math>A_{10}=-6.33661 \times 10^{-10}</math></p>

**TABLE 4C**  
**VARIABLE INTERVAL**

	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.33	LONG FOCAL POINT END f=35.42
A	1.530	8.117	15.363
B	15.770	9.183	1.937
C	8.000	3.409	1.500
D	3.964	9.176	11.332

TABLE 4D  
PARAMETER VALUE OF  
CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.47$
$(f_{12T}/f_1)=-1.308$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.565$

# FIG. 54A

TABLE 5A

$f=7.52 \sim 35.42$ ,  $F=2.70 \sim 4.02$ ,  $\omega=33.09 \sim 7.35$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	39.389	1.20	1.84666	23.78	1st LENS
02	20.025	3.88			
03	158.989	0.10	1.53172	48.84	2nd LENS
04	26.736	2.70	1.77250	49.62	3rd LENS
05	578.390	▲A			
06*	-71.421	1.00	1.80610	40.73	4th LENS
07*	8.802	3.05			
08	-16.232	0.80	1.51742	52.15	5th LENS
09	11.846	2.06	1.84666	23.78	6th LENS
10	$\infty$	▲B			
11	DIAPHRAGM	0.50			
12*	7.657	1.12	1.58913	61.25	7th LENS
13	8.381	▲C			
14*	9.908	2.63	1.58913	61.25	8th LENS
15*	-40.037	0.11			
16	38.816	2.12	1.48749	70.44	9th LENS
17	-18.714	0.18			
18	15.283	1.87	1.58913	61.25	10th LENS
19	-112.371	1.17	1.80518	25.46	11th LENS
20	6.199	▲D			
21	17.732	1.96	1.64769	33.84	12th LENS
22*	-121.961	OPTION			
23	$\infty$	3.214	1.51680	64.20	VARIETY OF FILTERS
24	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)

TABLE 5A



# FIG. 54B

## TABLE 5B

<p>NON-SPHERICAL SURFACE OF 6th SURFACE  <math>K=0.0</math>, <math>A_4=9.14684 \times 10^{-5}</math>, <math>A_6=-9.34472 \times 10^{-7}</math>, <math>A_8=1.42322 \times 10^{-8}</math>  <math>A_{10}=-1.17627 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 7th SURFACE  <math>K=0.09374</math>, <math>A_4=2.75961 \times 10^{-5}</math>, <math>A_6=1.27476 \times 10^{-6}</math>, <math>A_8=1.62751 \times 10^{-8}</math>  <math>A_{10}=7.41921 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 12th SURFACE  <math>K=-1.26140</math>, <math>A_4=2.67355 \times 10^{-4}</math>, <math>A_6=-6.25917 \times 10^{-6}</math>, <math>A_8=8.12274 \times 10^{-7}</math>  <math>A_{10}=-3.08665 \times 10^{-8}</math></p>
<p>NON-SPHERICAL SURFACE OF 14th SURFACE  <math>K=-1.30919</math>, <math>A_4=-1.18876 \times 10^{-5}</math>, <math>A_6=2.33312 \times 10^{-6}</math>, <math>A_8=-1.34009 \times 10^{-8}</math>  <math>A_{10}=-4.54838 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 15th SURFACE  <math>K=-46.11855</math>, <math>A_4=7.30394 \times 10^{-5}</math>, <math>A_6=3.24821 \times 10^{-6}</math>, <math>A_8=-2.36224 \times 10^{-8}</math>  <math>A_{10}=-5.40644 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE OF 22th SURFACE  <math>K=45.76087</math>, <math>A_4=-5.63924 \times 10^{-5}</math>, <math>A_6=-2.40860 \times 10^{-6}</math>, <math>A_8=7.82626 \times 10^{-8}</math>  <math>A_{10}=-1.12266 \times 10^{-9}</math></p>

## TABLE 5C VARIABLE INTERVAL

	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$
A	1.239	7.297	13.763
B	14.024	7.966	1.500
C	8.000	3.593	1.500
D	3.950	10.036	11.215

## TABLE 5D PARAMETER VALUE OF CONDITIONAL EXPRESSION

$(D_{3W}-D_{3T})/(D_{1T}-D_{1W})=0.52$
$(f_{12T}/f_1)=-1.223$
$(f_{12T}/f_{12W})/(f_T/f_W)=0.559$

FIG. 54B

# FIG. 55A

TABLE 6A  
f=7.52~35.42, F=2.62~4.00,  $\omega$ =32.99~7.41

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	26.529	1.20	1.84666	23.78	1st LENS
02	15.607	1.17			
03	16.702	4.36	1.77250	49.62	2nd LENS
04	-371.916	▲A			
05*	-29.404	1.00	1.80610	40.73	3rd LENS
06	8.571	2.20			
07	32.023	0.80	1.54072	47.20	4th LENS
08	8.557	2.49	1.84666	23.78	5th LENS
09	30.960	▲B			
10	DIAPHRAGM	0.50			
11*	7.674	1.10	1.58913	61.25	6th LENS
12	8.158	▲C			
13*	10.021	2.54	1.58913	61.25	7th LENS
14*	-63.691	0.10			
15	15.867	2.15	1.48749	70.44	8th LENS
16	-50.882	0.10			
17	12.522	1.82	1.59913	61.25	9th LENS
18	76.837	0.80	1.80518	25.46	10th LENS
19	5.641	▲D			
20	18.992	3.37	1.60342	38.01	11th LENS
21*	-47.165	OPTION			
22	$\infty$	3.214	1.51680	64.20	VARIETY OF FILTERS
23	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)

**FIG. 55B**

TABLE 6B

<p><b>NON-SPHERICAL SURFACE OF 5th SURFACE</b>  <math>K=0.0</math>, <math>A_4=1.37015 \times 10^{-4}</math> <math>A_6=-9.81958 \times 10^{-7}</math> <math>A_8=9.21207 \times 10^{-9}</math>  <math>A_{10}=-4.92691 \times 10^{-11}</math></p>
<p><b>NON-SPHERICAL SURFACE OF 11th SURFACE</b>  <math>K=-1.20196</math>, <math>A_4=2.83724 \times 10^{-4}</math> <math>A_6=-6.86713 \times 10^{-6}</math> <math>A_8=9.48847 \times 10^{-7}</math>  <math>A_{10}=-3.87184 \times 10^{-8}</math></p>
<p><b>NON-SPHERICAL SURFACE OF 13th SURFACE</b>  <math>K=-1.13642</math>, <math>A_4=6.34825 \times 10^{-6}</math> <math>A_6=2.90033 \times 10^{-6}</math> <math>A_8=-3.90207 \times 10^{-8}</math>  <math>A_{10}=1.09626 \times 10^{-10}</math></p>
<p><b>NON-SPHERICAL SURFACE OF 14th SURFACE</b>  <math>K=-70.94256</math>, <math>A_4=6.79619 \times 10^{-5}</math> <math>A_6=3.00428 \times 10^{-6}</math> <math>A_8=-3.35316 \times 10^{-8}</math>  <math>A_{10}=-1.72607 \times 10^{-10}</math></p>
<p><b>NON-SPHERICAL SURFACE OF 21th SURFACE</b>  <math>K=14.57109</math>, <math>A_4=-5.21909 \times 10^{-5}</math> <math>A_6=-3.69390 \times 10^{-6}</math> <math>A_8=7.04367 \times 10^{-8}</math>  <math>A_{10}=-6.33661 \times 10^{-10}</math></p>

**TABLE 6C**  
**VARIABLE INTERVAL:**  
**TYPICAL PHOTOGRAPHING REGION**

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END f=7.52	MIDDLE FOCAL LENGTH f=16.33	LONG FOCAL POINT END f=35.42	SHORT FOCAL POINT END f=7.44	MIDDLE FOCAL LENGTH f=15.71	MIDDLE FOCAL POINT END f=31.60
A	1.530	8.117	15.363	1.530	8.117	15.363
B	15.770	9.183	1.937	15.770	9.183	1.937
C	8.000	3.409	1.500	8.000	3.409	1.500
D	3.964	9.176	11.332	3.571	7.896	7.438

# FIG. 55C

TABLE 6D  
VARIABLE INTERVAL  
IN MACRO MODE (A PHOTOGRAPHIC  
DISTANCE IS FROM AN IMAGE SURFACE)

	0.3m	0.077m
	f=12.03	f=10.43
A	4.508	4.508
B	12.792	12.792
C	3.816	3.816
D	8.960	4.150

TABLE 6E  
PARAMETER VALUE OF  
CONDITIONAL EXPRESSION

$(L1C-L1W)/(L1T-L1W)=0.215$
$(L3C-L3T)/(L3W-L3T)=0.356$
$(D3W-D3T)/(D1T-D1W)=0.47$
$(f12T/f1)=-1.308$

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# FIG. 56B

## TABLE 7B

<b>NON-SPHERICAL SURFACE OF 6th SURFACE</b> $K=0.0$ , $A_4=9.14684 \times 10^{-5}$ $A_6=-9.34472 \times 10^{-7}$ $A_8=1.42322 \times 10^{-8}$ $A_{10}=-1.17627 \times 10^{-10}$
<b>NON-SPHERICAL SURFACE OF 7th SURFACE</b> $K=0.09374$ , $A_4=2.75961 \times 10^{-5}$ $A_6=1.27476 \times 10^{-6}$ $A_8=-1.62751 \times 10^{-8}$ $A_{10}=7.41921 \times 10^{-10}$
<b>NON-SPHERICAL SURFACE OF 12th SURFACE</b> $K=-1.26140$ , $A_4=2.67355 \times 10^{-4}$ $A_6=-6.25917 \times 10^{-6}$ $A_8=8.12274 \times 10^{-7}$ $A_{10}=-3.08665 \times 10^{-8}$
<b>NON-SPHERICAL SURFACE OF 14th SURFACE</b> $K=-1.30919$ , $A_4=-1.18876 \times 10^{-5}$ $A_6=2.33312 \times 10^{-6}$ $A_8=-1.34009 \times 10^{-8}$ $A_{10}=-4.54838 \times 10^{-10}$
<b>NON-SPHERICAL SURFACE OF 15th SURFACE</b> $K=-46.11855$ , $A_4=7.30394 \times 10^{-5}$ $A_6=3.24821 \times 10^{-6}$ $A_8=-2.36224 \times 10^{-8}$ $A_{10}=-5.40644 \times 10^{-10}$
<b>NON-SPHERICAL SURFACE OF 22th SURFACE</b> $K=45.76087$ , $A_4=-5.63924 \times 10^{-5}$ $A_6=-2.40860 \times 10^{-6}$ $A_8=7.82626 \times 10^{-8}$ $A_{10}=-1.12266 \times 10^{-9}$

## TABLE 7C

### VALUABLE INTERVAL: TYPICAL PHOTOGRAPHING REGION

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.42$	SHORT FOCAL POINT END $f=7.42$	MIDDLE FOCAL LENGTH $f=15.68$	MIDDLE FOCAL POINT END $f=31.93$
A	1.239	7.297	13.763	1.239	7.297	13.763
B	14.024	7.966	1.500	14.024	7.966	1.500
C	8.000	3.593	1.500	8.000	3.593	1.500
D	5.563	10.036	11.215	5.118	8.673	7.390

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# FIG. 56C

TABLE 7D  
VARIABLE INTERVAL  
IN MACRO MODE  
(PHOTOGRAPHIC DISTANCE  
IS FROM IMAGE SURFACE)

	0.3m	0.077m
	f=12.55	f=10.72
A	4.406	4.406
B	10.857	10.857
C	3.864	3.864
D	10.270	4.960

TABLE 7E  
PARAMETER VALUE OF  
CONDITIONAL EXPRESSION

$(L1C-L1W)/(L1T-L1W)=0.253$
$(L3C-L3T)/(L3W-L3T)=0.364$
$(D3W-D3T)/(D1T-D1W)=0.52$
$(f12T/f1)=-1.223$

**FIG. 57A**  
**TABLE 8A**

$f=7.52\sim 35.41$ ,  $F=2.76\sim 3.93$ ,  $\omega=33.03\sim 7.33$

SURFACE NUMBER	R	D	Nd	$\nu_d$	REMARKS
01	49.347	1.20	1.84666	23.78	1st LENS
02	21.523	4.03	1.53172	48.84	2nd LENS
03	-735.434	0.10			
04	24.328	2.83	1.77250	49.62	3rd LENS
05	253.175	▲A			
06*	-60.958	1.00	1.84666	40.73	4th LENS
07	8.431	2.83			
08	-14.822	0.80	1.51680	64.20	5th LENS
09	12.501	1.89	1.84666	23.78	6th LENS
10	$\infty$	▲B			
11	DIAPHRAGM	0.50			
12*	12.181	1.16	1.58913	61.25	7th LENS
13	19.058	▲C			
14*	10.066	2.66	1.51680	64.20	8th LENS
15	-37.782	0.23			
16*	26.397	2.21	1.48749	70.44	9th LENS
17	-19.437	0.10			
18	15.810	1.87	1.62374	47.05	10th LENS
19	-94.257	0.81	1.80518	25.46	11th LENS
20	6.298	▲D			
21	16.724	3.19	1.62004	36.30	12th LENS
22*	-226.088	OPTION			
23	$\infty$	3.214	1.51680	64.20	VARIETY OF FILTERS
24	$\infty$				

▲A: VARIABLE(A)  
 ▲B: VARIABLE(B)  
 ▲C: VARIABLE(C)  
 ▲D: VARIABLE(D)



# FIG. 57B

TABLE 8B

<p>NON-SPHERICAL SURFACE IN 6th SURFACE  <math>K=0.0</math>, <math>A_4=7.30131 \times 10^{-5}</math> <math>A_6=-7.18253 \times 10^{-7}</math> <math>A_8=7.92813 \times 10^{-9}</math>  <math>A_{10}=-4.79927 \times 10^{-11}</math></p>
<p>NON-SPHERICAL SURFACE IN 12th SURFACE  <math>K=-2.47920</math>, <math>A_4=1.19559 \times 10^{-4}</math> <math>A_6=-7.86193 \times 10^{-6}</math> <math>A_8=8.04663 \times 10^{-7}</math>  <math>A_{10}=-3.15795 \times 10^{-8}</math></p>
<p>NON-SPHERICAL SURFACE IN 14th SURFACE  <math>K=-1.36970</math> <math>A_4=-2.75811 \times 10^{-5}</math> <math>A_6=-9.84986 \times 10^{-7}</math> <math>A_8=-5.50234 \times 10^{-8}</math>  <math>A_{10}=-1.76532 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE IN 16th SURFACE  <math>K=-16.43413</math>, <math>A_4=-5.94270 \times 10^{-5}</math> <math>A_6=3.37933 \times 10^{-7}</math> <math>A_8=8.00684 \times 10^{-8}</math>  <math>A_{10}=3.43034 \times 10^{-10}</math></p>
<p>NON-SPHERICAL SURFACE IN 22th SURFACE  <math>K=0.0</math>, <math>A_4=-4.02551 \times 10^{-5}</math> <math>A_6=-2.96070 \times 10^{-6}</math> <math>A_8=9.12260 \times 10^{-8}</math>  <math>A_{10}=-1.34602 \times 10^{-9}</math></p>

TABLE 8C  
VARIABLE INTERVAL:  
TYPICAL PHOTOGRAPHING REGION

	AT INFIN- ITY	AT INFIN- ITY	AT INFIN- ITY	0.3m	0.4m	0.5m
	SHORT FOCAL POINT END $f=7.52$	MIDDLE FOCAL LENGTH $f=16.33$	LONG FOCAL POINT END $f=35.41$	SHORT FOCAL LENGTH $f=7.43$	MIDDLE FOCAL POINT END $f=15.76$	MIDDLE FOCAL POINT END $f=32.02$
A	1.362	7.523	13.223	1.362	7.523	13.223
B	13.361	7.201	1.500	13.361	7.201	1.500
C	8.000	3.864	1.500	8.000	3.864	1.500
D	5.373	9.240	11.288	4.937	7.944	7.412

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## FIG. 57C

TABLE 8D  
VARIABLE INTERVAL IN MACRO MODE  
(PHOTOGRAPHIC DISTANCE IS  
FROM IMAGE SURFACE)

	0.3m	0.077m
	$f=12.79$	$f=11.19$
A	5.415	5.415
B	9.308	9.308
C	4.309	4.309
D	8.630	3.620

TABLE 8E  
PARAMETER VALUE OF  
CONDITIONAL EXPRESSION

$(L1C-L1W)/(L1T-L1W)=0.342$
$(L3C-L3T)/(L3W-L3T)=0.432$
$(D3W-D3T)/(D1T-D1W)=0.55$
$(f12T/f1)=-1.211$